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**ORCHESTRATING EFFECTIVE PRACTICES IN DEVELOPMENTAL MATH: REDESIGN IN DEVELOPMENTAL EDUCATION WITHIN AN ACADEMIC SUCCESS CENTER**

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# Orchestrating Effective Practices in Developmental Math:

# Redesign in Developmental Education within an Academic Success Center

by

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## Dedication

Early in my teaching career, while working at an inner city community college campus in Florida, I wrote an article that appeared in a newsletter published by the institution. In that article titled, "Lessons Learned in One Tiny Classroom Can Make a Big Difference," I wrote about being inspired by a number of students enrolled in developmental education classes, who against great odds, not only exceeded, but excelled beyond my greatest expectations. Each of them had a story that was truly remarkable, and each had experienced unbelievable heartbreak and tragedy in their short lives. Many times I found myself pre-occupied by the personal losses they encountered. Gang-related incidents, drive by shootings, gun battles with police, suicides, and convictions for murder, robbery, and sexual assault took several of the students. However, a number of those who struggled to move forward with their education would tell me that my encouraging words and depth of commitment to seeing them succeed had a profound effect on their lives. I had no knowledge that what I was doing did anything to propel these students forward. For the most part, I was only emulating what other teachers had done for me.

Like my students, I was juggling family, home, and career. I had no time to review the research in the field of developmental education. In fact, it never crossed my mind. I was too busy trying to determine what needed to be done to help get these students through my courses, how I might find resources to help me do that within the institution where I worked, and how I might collaborate with other faculty members who were interested in trying what was then considered innovative approaches that could

help these students. Together, we developed a fairly involved plan using a team approach that provided additional academic support to help these students succeed.

I was not aware that what we were doing was being published in research journals by John E. Roueche, Hunter Boylan, Martha Maxwell, Vincent Tinto, Patricia K. Cross, and others as best practices in developmental education. However, over the years, I would come to know this research well, and eventually I would have the opportunity to study with John E. Roueche and Hunter Boylan, two men who have contributed an outstanding body of research to the field of developmental education. What I learned from these two individuals solidified my commitment to developmental education, and that commitment opened the door for me to serve as president of the Florida College Reading Council, a board member with the Florida Developmental Education Association, and president of the National Association for Developmental Education, the largest organization of professional developmental educators in the country. Today, this association includes 39 chapters nationwide including the District of Columbia.

It is to this group of professionals, and the students they continue to serve, that I dedicate this research study. The lessons I learned so long ago continue to drive me to search for ways to improve what we are doing for this student population, many of whom would have nowhere to turn without the community college and developmental education. Also, this is dedicated to my daughter, Amanda, an educator who is now pursuing her doctorate and working as an adviser at the University of South Florida. You have helped me realize that my life and work has come full-circle. In you, I see the

passion, commitment, and drive of those dedicated to promoting educational values that cross the boundaries of race, gender, class, ability, language, appearance, and sexuality.

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**Orchestrating Effective Practices in Developmental Math:**

**Redesign in Developmental Education within an Academic Success Center**

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The University of Texas at Austin, 2014

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Developmental mathematics courses are intended to help underprepared students but often are a barrier for hundreds of students who fail these courses. High failure rates prevent students from achieving their academic goals, therefore; educational institutions are looking for methods to increase success in these courses.

Such was the case at Florida State College at Jacksonville (FSCJ), where high failure rates in developmental mathematics presented problems to the institution and its students. To increase pass rates in developmental education courses, a college-wide redesign initiative introduced in 2009 led to the implementation of a research-based model for developmental education. This model would be implemented in the form of Academic Success Centers (ASC) incorporating practices tailored to increase student success and persistence.

To examine success rates of students taking developmental education courses in the ASCs, the College conducted a longitudinal predictive analytics study known as the Chi-squared Automatic Interaction Detection (CHAID). The CHAID analyzed student success and retention of 10,051 developmental mathematics students over two academic

terms. Additionally, the CHAID identified highly successful developmental mathematics teachers. These teachers, and the environment in which they taught (ASCs), became the basis of this qualitative study.

The purpose of the study was two-fold. First, it focused on identifying pedagogical practices of highly successful developmental mathematics faculty who taught in the Academic Success Centers at FSCJ. Second, it focused on the areas of impact of the ASC as an environmental factor in student success.

Data collected through observations, interviews, and documented analysis, along with the use of text mining, revealed that patterns emerged among participants in which they shared common beliefs about the importance of communicating with students, forming relationships with students, lecture and lab practices, the availability of physical resources, and the availability of academic support services within the environment where they interacted with their students. The intent of using the evidence from the key findings is to provide community college leaders with insight into pedagogical practices shared by highly successful developmental mathematics teachers and the role the learning environment serves in meeting students' educational needs.

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## Chapter One: Introduction

The soaring costs of obtaining a college degree, coupled with increasing numbers of students arriving at educational institutions underprepared for the academic demands of college-level courses, have made developmental education one of the most debated issues in postsecondary education today. Nationally, approximately 60% of community college students are referred to one or several developmental courses (Attewell, Lavin, Domina, & Levey, 2006; Bailey, Jeong, & Cho, 2010). In some community colleges, more than 90% of entering students are deemed insufficiently prepared to start college-level work (Kerrigan & Slater, 2010). According to the Lumina Foundation (2008), nearly one-third of first-year college students require remedial education in reading, writing, or mathematics.

Unfortunately, since the 1970s community college developmental education has too often been implemented by what is referred to as a remediation only model (Keimig, 1983), also known as the stockpiling model (Boylan & Saxon, 2012). While this scenario is especially disheartening for students, it is also particularly disappointing for faculty and administrators trying to develop and operationalize programs that can help underprepared students. This sad commentary is all too familiar to thousands of incoming students taking some sort of assessment that places them into various levels of remediation where they experience hardships and spiral downward until they get bored, quit, run out of time and/or money, or somehow manage to pass the courses needed to get into college credit classes (Boylan & Saxon, 2012).

Even more disturbing is that a large number of students who place into developmental courses, particularly developmental math, are prevented from achieving their educational goals because they never complete these courses (Bonham & Boylan, 2011). According to Hall and Ponton (2005), mathematics is the subject having the strongest tie to student success in degree attainment. Failing to complete developmental math and required college-level math not only prevents individuals from earning a college degree and pursuing certain professions, but also has consequences for a young adult's likelihood of employment (Hodara, 2011). Of the 57 community colleges participating in the Achieving the Dream: Community Colleges Count initiative (www.achievingthedream.org), only one-third of students who were referred to developmental education completed the recommended sequence of math courses, and of the students who enrolled in developmental education courses, only 20% eventually complete a required college-level math course (Bailey et al., 2010). Given the negative consequences of failing to complete developmental mathematics, it is critical to identify potential ways to improve the success of developmental mathematics students (Hodara, 2011). Presently, nowhere in the community college curriculum is the failure rate of graver concern than in developmental mathematics (Merseth, 2011). However, as Byrk and Treisman (2010) espoused, mathematics needs to be a gateway, not a gatekeeper, to a successful college education. No matter what their field of study may be, students must come to see math as an essential aspect of their everyday lives (2010).

While the research literature showed that issues in developmental education are both complex and multilayered, the literature also supported the research that the key to

building successful developmental education programs is to create strong, efficient, and effective environments with teachers who are committed to student success. In 2009, Florida State College at Jacksonville (FSCJ) began designing a model to improve the efficiency and effectiveness of its developmental education program. This model would eventually be implemented in the form of Academic Success Centers (ASCs) that incorporated practices tailored to help students persist and succeed. As Jamie Merisotis, President of the Lumina Foundation, reminded us, "All students who take that first step through the college door, no matter how tentative, deserve every chance to succeed" (Lumina Foundation, 2008, p. 1).

**Statement of Problem**

After decades of published research in developmental education, there is still much criticism directed at professionals in the field for both a lack of empirical evidence of any promising techniques or practices as well as rigorous research documenting its effectiveness (Boylan & Saxon, 2012; Levin & Calcagno, 2008). This criticism would appear to be abundantly evident when looking at the numbers of students taking and failing developmental mathematics courses at educational institutions across this country.

Overall, mathematics seems to be the biggest barrier for a large percentage of the community college student population (Achieving the Dream, 2006). Approximately two of three community college students referred to a remedial mathematics sequence do not complete it (Bailey et al., 2010). In a study, which included 2-year and 4-year colleges, the completion rate for the full sequence of developmental courses was lowest

in mathematics, at 21% (Schiel & Sawyer, 2002). According to a U.S. Department of Education study, the three courses with the highest rates of failure and withdrawal in postsecondary education are all developmental mathematics courses (Cullinane & Treisman, 2010). With developmental mathematics having the highest rate of failure and withdrawal, institutions look for ways to provide students opportunities to obtain remediation in the subject area. Some studies estimate that remediation in mathematics reduces the likelihood of students dropping out and increases the likelihood that students will complete a degree. These studies also contend that students in remediation have better educational outcomes (Bettinger & Long, 2005; Martorell & McFarlin, 2010). While it would appear that remedial mathematics courses are helpful, the frustration expressed by students enrolled in developmental mathematics courses is mounting. Too many students find developmental mathematics an insurmountable impediment to their academic success (Merseth, 2011). Sierpinska, Bobos, and Knipping (2008) listed some of the frustrations articulated by students taking a university-level prerequisite mathematics course: lack of support from the college, lack of understanding from their instructors, disinterest of faculty teaching the course, and irrelevance of course material. Student frustrations can account for the high levels of attrition of underprepared students. John Roueche (1968) conducted one of the first studies that investigated the levels of attrition of underprepared students. Through a nationwide study of community colleges, Roueche found that approximately 90% of the students required to enroll in developmental or remedial education courses either withdrew or failed (Mireles, Offer, Ward, & Dochen, 2011).

In addition, affective factors such as negative attitudes and low motivation regarding mathematics further inhibit student success (Ferren & McCafferty, 1992). These affective factors are connected to growing frustrations from students who are prevented from achieving their educational goals because they cannot complete developmental courses. Dismal completion figures are emerging at a time when national programs such as Achieving the Dream (ATD) report that earning a postsecondary degree has never been more critical to getting a job that pays family-supporting wages (Collins, 2009). In states participating in ATD, a multiyear national initiative designed to help more community college students complete courses, earn certificates, or transfer to other institutions to continue their studies, 60% of students are referred to developmental courses. Of those who enroll, only 15% complete all of their developmental education requirements within the first academic year. Almost half–46%–do not complete any of their developmental education requirements in the first academic year (Clery & Topper, 2008). Taking these factors into consideration, many states called for higher education institutions, primarily community colleges, to redesign developmental education programs. These directives, often due to pressures from the public and state legislatures, are now pushing community colleges to address the needs of these students early in terms of their goals for attending college to ensure they are academically prepared to finish their educational programs.

**Purpose of Study**

The purpose of this qualitative study was two-fold. First, it focused on identifying pedagogical practices of faculty, with the highest rates of student success,

teaching the highest level developmental mathematics course within the ASCs at FSCJ. Faculty members asked to participate in this study were identified as highly successful by a predictive analysis study, Chi-squared automatic Interaction Detection (CHAID). The CHAID contained an analysis of student success and retention in remedial mathematics courses that included 10,051 elementary/intermediate algebra students over two academic terms. In addition, this study focused on the areas of impact of the ASC as an environmental factor in student success. For purposes of this study, student success was identified as completion of a developmental math class with a grade of *C* or higher and passing a standardized (state exit exam developed by the state of Florida), end-of-class assessment.

**Research Questions**

The following two research questions guided this study:

1. What are the pedagogical practices of developmental mathematics teachers who have the highest rates of student success?
2. What are the areas of impact of the ASC as an environmental factor in student success?

**Brief Overview of Methodology**

The most important contributing factor for developmental education excellence is what transpires between faculty and students in the classroom (Boylan & Saxon, 2012). Therefore, I followed a case study approach and documented teaching practices used by successful developmental math faculty in the ASC setting. I was able to search for deeper, richer meaning and understanding of the practices of these participants in this

environment by conducting interviews, classroom observations, and a detailed review of their syllabi.

By interviewing highly successful developmental math faculty, observing them in the ASC environment, and reviewing course documents they distributed to their students, I obtained meaningful data that can be used to improve professional development training for developmental mathematics faculty at FSCJ.

**Significance of Study**

Approximately 60% of community college students are referred to one or several developmental courses (Attewell et al., 2006; Bailey et al., 2010). Overall, mathematics appears to be the biggest barrier for a large percentage of the community college student population (Achieving the Dream, 2006). Approximately two of three community college students referred to a remedial mathematics sequence do not complete it (Bailey et al., 2010).

A 2007 Florida Department of Education study revealed that of students who failed to complete their developmental coursework, only 15% remained in college, less than 1% earned vocational or career certificates, and none finished with associate degrees within two years. Alternately, students successfully completing developmental courses appeared to be as successful as their non-developmental education counterparts. While certain parts of this report pointed out positive aspects for students enrolled in developmental education courses, higher educational institutions were being asked to make a serious attempt to reduce the need for developmental education. Therefore, it became beneficial for the state college systems to provide higher educational institutions

with support and resources to review and pilot innovative strategies and interventions for improving developmental education programs. These strategies and interventions included setting and broadly communicating college-readiness standards, providing early assessment opportunities for high school students, and ensuring that high school and college-entrance standards and expectations are aligned (Collins, 2009).

Collins also pointed out that dual enrollment courses, which are now implemented in a number of states as college-readiness strategies, are appealing to more students by reducing the time and cost required to earn a college degree. This incentive increased even more when high school students took these courses without paying tuition.

Furthermore, a study on outcomes in Florida and New York suggested that dual enrollment improved subsequent college performance (Karp, Calcagno, Hughes, Jeong, & Bailey, 2008). Preliminary evidence suggested that college credit in high school might be a promising preventive strategy for states looking to increase college readiness and decrease the need for developmental education (Collins, 2009).

The results of the 2007 study prompted the Florida Legislature to recommend that all colleges and universities offering developmental education courses implement certain redesign procedures, including, but not limited to, collapsing three levels of sequential courses into two, reducing instructional costs, and investigating ways to enable students to move from one course to another within a different time frame than is permitted in the traditional classroom format.

Prior to this legislative recommendation, FSCJ spent five years and $5 million developing and implementing a Quality Enhancement Plan (QEP) that focused on several initiatives to improve developmental education courses. Because the results of the QEP did not reveal any difference in the success rate of those students enrolled in remedial courses, college leaders at FSCJ already had begun looking at alternative ways to improve the persistence and success rates of students enrolled in developmental education courses (D. Green, personal communication, January 28, 2012).

In conducting research related to the redesign process, leadership at FSCJ discovered that large populations of its students were demanding a variety of approaches to instruction. The traditional lockstep lecture format alone was not accommodating the diverse academic needs of adult learners, who benefit considerably from alternative delivery methods that allow them to complete required course work—particularly developmental (or remedial) —more effectively, efficiently, and flexibly (J. Chambers, personal communication, January 28, 2012). Consequently, it was determined that co-locating classrooms, computer labs, and tutoring resources in a supportive, nurturing learning environment (a move from a decentralized setting to a centralized setting) would serve as the approach to meeting the educational needs of developmental education students at FSCJ (D. Green, personal communication, January 28, 2012).

To adhere to legislative recommendations for redesign in developmental education programs and to focus on developmental students' success, FSCJ established Academic Success Centers (ASCs) that opened on all five of its campuses during fall 2010. This redesign approach for developmental education was chosen because it is

conducive to engaging a diverse population of students, both individually and collectively, in the learning process, while reducing instructional costs and maximizing students' abilities to progress successfully through developmental education courses (K. Ciez-Volz, personal communication, January 28, 2012). While all developmental education classes at FSCJ were moved into the ASC setting, there was a need to focus on developmental mathematics courses that had presented problems to both the institution offering these courses (FSCJ) and the students taking these courses (D. Green, personal communication, January 28, 2012).

Because the redesign approach of developmental courses at FSCJ had focused on activities to refine and improve the developmental education program, the decisions made pertaining to these courses, and the services offered to students, was data driven. The ASC model enabled FSCJ to follow field research recommendations that enabled faculty to look at the performance of students in developmental education classes, develop baseline data, determine where improvements could be made, and mark progress against the baseline (Boylan & Saxon, 2012). In the past, much of this data was dispensed only to state officials or community college administrators. This was not the case at FSCJ. The Department of Student Analytics and Research gathered and provided information on the performance of developmental students to faculty and other College officials directly involved in developmental education activities. The process of collecting and disseminating assessment and evaluation information is explained in Appendix A. Therefore, the results of the data gathered from this particular study will be distributed to those who can do the most to make any needed changes.

## Assumptions and Limitations

Three assumptions were made in conducting this study. First, that developmental mathematics faculty, with the highest rates of student success, share a number of practices that contribute to students successfully completing their courses. Second, that these practices could be observed in the ASC environment. However, it was expected that the subjects would act differently when they were being observed. Miles and Huberman (1994) stated that qualitative research is conducted through an intense and/or prolonged contact with a "field" or life situation (p. 6). While conducting this particular study, participants were observed in everyday classroom situations. A broad overview of the whole setting in the ASC environment was obtained rather than focusing on individual components. The researcher remained a quiet examiner and did not make comments or share information with faculty participants while they were being observed in the classroom setting. Lastly, it was assumed that faculty would answer interview questions honestly and without reservation.

Some limitations are associated with this study. In conducting a qualitative study, there is an inability to generalize and transfer findings to another educational context. Also, the construct of the ASCs at FSCJ included different elements of effective practices in developmental education. Some of the practices used at FSCJ within the ASC model are not utilized by other institutions that have limited resources and different philosophies regarding their approach to implementing developmental education programs—primarily the approach used to improve the pass and completion rates in developmental mathematics courses.

**Definitions of Terms**

*Academic Success Center (ASC)*: A center designed to house classrooms, computer labs, and tutoring resources in a supportive, nurturing learning environment. This design, based on research in the field of developmental education, is outlined in the introduction of the literature review included within this treatise.

*Behavioral Practices*: Practices shaped by behavioral pedagogy that include anything an individual does when interacting with his or her physical environment.

*Benchmark*: A systematic process of comparing an organization's performance on key measures to others' performances. This process usually emphasizes comparing one's performance not only to a performance average but also to an objective standard of excellence (Center for Community College Student Engagement [CCCSE], 2010, p. 2).

*Chi-squared Automatic Interaction Detection (CHAID)*: A type of statistic that predicts the significant list of independent variables and calculates which variables predict student success. The participants in this study were identified through a CHAID study completed by FSCJ's Office of Student Analytics and Research. This study yielded a significant list of 13 independent variables and calculated which of those variables predict student success. Based on the independent variables (predictors), the study generated a cluster of developmental mathematics faculty with the highest student success rates (Michalski, 2011).

*Course Redesign*: The process of re-conceiving whole courses to achieve better learning outcomes at a lower cost and incorporating the use, where applicable, of technology (Twigg, 2011).

*Developmental Education*: According to research in the field, developmental education is defined as a range of integrated courses and services governed by the principles of adult learning and development (Boylan, 2002). While the term remedial education and remediation are also used in conjunction with developmental education, the National Association of Developmental Education (NADE) began emphasizing the term developmental education versus remedial education in the 1980s. Over time, NADE began including learning assistance and support services such as assessment, tutoring, counseling, and academic advising as vital components in developmental education programs. Today, developmental education has grown to include training for students in life skills that can include time management, basic financial planning, health and wellness, problem solving, and career exploration.

*Excessive Class Size*: As defined by the policy at Florida State College at Jacksonville, class size in developmental education classes (mathematics, reading, and writing) will not exceed 22 student enrollees.

*Master Student*: Students who specialize in assisting students who are enrolled in developmental education and gateway reading, writing, and mathematics classes. These students attend faculty class/lab sessions and may tutor students in the classroom, tutoring labs, and in small group sessions outside of class.

*Pedagogical Approach*: The perspective used to plan and implement instructional strategies.

*Persistence*: The reenrollment of a college student for consecutive semesters.

*Redesign*: Directives, often stemming from public viewpoint, state legislatures, and/or state governing bodies of higher education systems that push community colleges to address the needs of developmental students early, in terms of their goals for attending college, to ensure that students are academically prepared to enroll and complete their educational programs.

*Remediation*: In education, remediation is intended to help students achieve a level of proficiency in core academic skills. In relation to developmental education programs, remediation is one intervention offered as a way of assisting underprepared students reach a level of preparedness.

*Retention*: The reenrollment of a college student for consecutive academic years.

*Student Engagement*: The time and effort students devote to activities empirically linked to desired outcomes of a college and what institutions do to induce students to take part in these activities (Kuh, 2009).

*Student Success*: Completion of a developmental math class with a grade of *C* or higher and passing a standardized end-of-class assessment. However, student success was defined differently by participants in this study. Most connected student success with teaching and learning practices and strategies and the environment created in the classroom.

*Variables for CHAID*: Student success is the dependent variable. Academic term, student gender, student race, student age, high school graduation, student zip code, student high school, high school city and state, campus/center, instructor name, course delivery method, same course, and previous served as the 13 independent variables.

**Chapter Summary**

This introduction provided a brief overview of:

- the national issues related to student completions in developmental education courses,
- growing concerns and frustrations of students taking developmental mathematics courses,
- percentages related to students both failing and withdrawing from developmental math courses,
- dismal completion rates across the country in developmental mathematics courses,
- directives administered to states mandating redesign of developmental education programs,
- an explanation of the redesign mandate in the state of Florida,
- the redesign of the developmental education program at FSCJ,
- the creation of ASCs, and
- the primary ingredients needed to implement a high-quality developmental educational program.

The purpose of this qualitative study was to identify effective classroom practices for developmental mathematics and determine whether commonalties existed among practices currently being used by faculty within an ASC environment designed specifically for the delivery of developmental education courses and services at FSCJ. For purposes of this study, faculty members who were asked to participate in this study were identified as highly successful, via a predictive analysis study (CHAID). The predictive analysis study contained an analysis of student success and retention in developmental education courses that included 10,051 elementary/intermediate algebra students over two academic terms (FSCJ, 2012).

**Organization of the Treatise**

Chapter one defined the study and explained the need to look at redesigning the approach to teaching developmental education courses, especially mathematics courses that present problems to both FSCJ and the students who take developmental mathematics courses at the institution. Chapter two examines the literature in developmental education, the redesign of delivery methods, and course redesign within a developmental education program. Chapter three outlines the methodology and conceptual framework for this study. Chapter four discusses the data analysis and findings. Chapter five presents the conclusions and recommendations of this study.

## Chapter Two: Literature Review

### Introduction

As discussed in chapter one, developmental mathematics courses are often gatekeepers that keep students from succeeding in college (Deka & Lieberman, 2008). This problem is significant at institutions across the country, both in universities and community colleges (Arendale, 2002; Heber & Selingo, 2009). This chapter presents a review of the literature in developmental education as well as references to its history. Much of this literature review focuses on those elements that research indicates contribute to the success and retention of developmental education students in reading, writing, and math. Various pedagogical approaches that emphasize learning theory and the infusion of academic support have shown great promise, including supplemental instruction (Arendale, 2000), cooperative learning (Armington, 2003), mastery learning (McClory, 2000), early start programs (Howell, Kurlaender, & Grodsky, 2010), and the use of technology (Epper & Baker, 2009). Arendale, (2000), Boylan (2002), and Roueche and Roueche (1993) discussed the importance of having an institution committed to the success of this student population along with the right mix of dedicated professionals and resources to design programs that can produce successful students. Therefore, focusing on developmental education programs and the services these programs commonly address, including academic preparedness, diagnostic assessment and placement, development of general and discipline-specific learning strategies, and affective barriers to learning (National Association for Developmental Education, 2012)

are important factors in improving the success rates of developmental mathematics students.

According to the National Center for Education Statistics, nearly 100% of the public community colleges in the United States offer some form of developmental education, and at least 43% of all incoming community college students take one or more developmental courses (Boylan & Saxon, 2012). However, research revealed varying percentages related to the number of students who are required to take developmental education courses. A report by Attewell, Lavin, Domina, and Levy (2006) showed that 58% of entering community college students take one or more developmental courses, while a 2007 report from the Kentucky Developmental Education Task Force indicated that between 64% and 96% of incoming Kentucky students have to take developmental mathematics.

Reports released nationally, such as the one from the Educational Testing Service (ETS), showed that student scores on the National Assessment of Education Progress in reading and mathematics have not improved in 20 years (Kirsch, Braun, Yomamoto, & Sum, 2007). American College Testing (2006) has indicated that almost half of current high school graduates do not read well enough to perform college-level reading tasks. It would appear that these reports make a case for the ongoing challenges that will continue to confront community colleges in educating students who have complex needs. While a number of public school reforms show promise, including reorganizing K-12 curriculum, large numbers of students entering postsecondary education are underprepared for college-level work (Greene & Forster, 2003).

Therefore, it is likely to take some time for these reforms to have any measurable impact on the skills of incoming community college students (Boylan & Saxon, 2012).

In reviewing the primary components needed to implement quality developmental educational and training programs, much of the research included references to alternative delivery methods that can be used in the successful redesign of courses within a developmental education program that incorporate alternative approaches to teaching developmental mathematics. The research in developmental education (e.g., Blair, 2006; Boroch et al., 2007; Boylan, 2002) outlined a number of effective practices that emphasize, among other things, that educators connect new knowledge to prior learning, include learner-centered activities in instructional methods, and provide students with feedback through the use of ongoing assessment. Some critical components, listed in Boylan's *What Works* (2002), should be incorporated in developmental education programs. These components can include, without being limited to, the following:

- Making a commitment to developmental education by identifying this student population and the programs designed to help these students, as a main concern (pp. 22-25);
- Providing academic advising (pp. 26-28);
- Enforcing mandatory assessment, placement, and orientation (pp. 35-39);
- Implementing organized and efficient program evaluation (pp. 39-43);
- Offering ongoing professional development and training for faculty and staff (pp. 46-49);

- Providing tutoring services (pp. 49 -50);
- Infusing technology within classrooms and/or laboratories (pp. 64-67); and,
- Utilizing varied teaching strategies (pp. 97-100).

In addition, excellence in developmental education cannot be achieved without a commitment from leadership (Boylan & Saxon, 2012). Schwartz and Jenkins (2007) explained that the effectiveness of developmental education can be enhanced if the policy environments in which these programs are delivered are committed to efficacy of developmental education, belief that it is equal in status of other college programs, persistence of underprepared students, and an intent to move students seamlessly into college-level courses (p. 23).

The combination of all of these key components and effective practices comprised the basis for the design, development, and implementation of the ASCs at FSCJ, the setting in which all full and part-time faculty who teach developmental education conduct their classes.

**Review of the Literature**

The offering of remedial courses in the United States has a long history. More than 370 years ago, Harvard recognized that students being admitted to college were not adequately prepared for college-level work. While students available for admission to colleges were small at the time, Harvard accommodated underprepared students by providing tutoring and other forms of remedial instruction. Over the years, developmental education has been viewed as a way to expand access and serve community workforce and economic needs (Casazza & Silverman, 1996). This view,

characterized by democratic ideals that community colleges would provide extended educational opportunities, is founded on the idea that a population of citizens who are educated is necessary to our nation's well-being (Gleaser, 1963) and thus was the concept on which America's first public community college, Joliet Junior College, was established in Illinois in 1901 (Joliet Junior College, 2012).

Roueche and Roueche (1999) pointed out, "if control resides where support originates, community colleges must meet community needs" (p. 9). For decades (Arendale, 2002), developmental education programs and services in the United States have continued to provide a way to create access and enhance retention for populations of students that have been traditionally underrepresented in higher education (Hardin, 1988). Because large numbers of incoming community college students have continued to need developmental education over the course of the first half of the 21st century (McCabe, 2003), it appears that developmental education will continue to be a major responsibility for American community colleges and failure to provide developmental education is not an option for community colleges or for the country (Arendale, 2010).

Considering that developmental education represents the first instructional contact for many students with a postsecondary institution, this initial contact can have a tremendous impact on student success (Boylan & Saxon, 2012). It also follows that if a student's first contact with a postsecondary institution is positive, then retention would be positively influenced (Boylan, Bliss, & Bonham, 1997; McCabe, 2000). Therefore, when determining the need for, or redesign of, developmental education programs, one

should begin by examining the components of effective developmental education programs.

The most effective developmental education programs are those that exist in an environment where the educational institution, as a whole, regards the program and services as the responsibility of the entire institution rather than that of a single program or a collection of services (Kiemig, 1983). Both administrators and faculty must recognize developmental education as a primary concern, and must support the distribution of resources needed to ensure program effectiveness. In addition, student retention in developmental education programs is important, and retention must be viewed as an institutional priority (Noel, Levitz, & Saluri, 1985). When institutional resources are organized in such a way to support student development, students are more likely to succeed (Boylan, 2002, p. 23). Developmental education programs that are guided by a clearly stated philosophy that governs the day-to-day delivery of courses and services have greater retention rates than programs in which actions are not guided by such a philosophy (Donovan, 1974).

Research consistently has demonstrated that mandatory assessment and placement contribute to student success (McCabe, 2000; McCabe & Day, 1998; Roueche & Roueche, 1999). Allowing students to enroll in courses for which they are not prepared is tantamount to promoting failure (Morante, 1989). As Roueche and Roueche (1999) observed, "Universities do not hesitate to prohibit students from enrolling in courses for which they are not prepared or have not completed

prerequisites" (p. 30). Continuing the practice of mandatory assessment and placement of entering students can promote student success.

Appropriate academic advising and mandatory orientation also comprise essential components of an effective developmental education program. Advising and orientation assist students in identifying and developing their educational and professional goals. Roueche and Roueche (1999) supported mandatory student orientations and noted that universities are far better at this practice than community colleges. Students who participate in orientations are more likely to be retained in community college than those who do not (Boylan & Saxon, 2012). Appropriate advising is the result of a carefully developed institutional plan and a commitment to student success. As catalysts of communication and agents of referral to other campus agencies, advisors must be well-informed about the nature and purpose of various academic support services, in order to make appropriate referrals (Boylan, 2002, p. 28).

A number of studies have highlighted the correlation between academic advising and student retention. Habley (1981) noted, "retention programs should focus on services which enable students to clarify their educational and career goals and relate those goals to academic offerings" (p. 46). In Beal and Noel's 1980 study of the retention programs of more than 900 institutions, participating administrators named inadequate academic advising as a major factor leading to student attrition. Other negative aspects mentioned included inadequate counseling systems, academic support services, career planning services, and a lack of student-faculty contact. However, a "caring attitude of faculty and staff" (with advising being one demonstration) was

ranked by the administrators as the most important retention factor on their campuses (pp. 43-45).

Successful developmental education programs utilize multiple teaching and learning strategies (Boylan, 2002; Epper & Baker, 2009). Much research has been generated over the last few years focusing on the benefit of varied teaching techniques in relation to developmental mathematics. Some of these varied teaching techniques include mastery learning (Boggs, Shore, & Shore, 2004); mentoring programs (Visher, Butcher, & Cerna, 2010); active, collaborative, and cooperative learning methods (Barkley, Cross, & Major, 2005; Davidson & Kroll, 1991); supplemental instruction (Martin & Arendale, 1994; Phelps & Evans, 2006); integrated classroom and laboratory activities, and learning centers (Boylan, 2002; Boylan, Bonham, Claxton, & Bliss, 1992; Boylan & Saxon, 1998; Maxwell, 1997; McCabe, 2000; Perin, 2004).

Integration of classroom and laboratory activities was noted as a key element in successful developmental programs. Involving a "concerted effort to insure that what goes on in the classroom is clearly connected and specifically supported by what goes on in the laboratory," integration "appears to be an essential component" to successful programs (Boylan, 2002, p. 64). According to Boylan, evidence of such integration entails communication between instructors and lab personnel about support of class activities via lab resources, use of lab resources and activities to support specific course goals and objectives, requirement that students participate in lab activities as part of their course assignment, and location of labs in close proximity to developmental courses they will support (Boylan, 2002, p. 65).

McCabe (2000) stated that one of the hallmarks of a successful developmental education program was the integration of laboratories and classrooms. Boylan (2002) added that when learning lab use is an integral part of the course, developmental students are more likely to persist and succeed. Access to individual and small-group tutoring, timely and topical workshops, software, and a variety of multimedia tools all serve to supplement class instruction and enrich student learning. Research supported the co-location of classrooms and labs for developmental students. The premise is that developmental students may be more likely to use various lab services and resources because of the facilities' close proximity to classrooms (Boylan, 2002).

Required tutoring in developmental education programs represents an excellent intervention tool. At a minimum, successful developmental education programs provide tutoring in reading, writing, mathematics, and study skills (Boylan, 2002, p. 49). Both individual and group tutoring can be effective, but group tutoring appears to be more effective for developmental students (Boylan et al., 1992). As Boylan, Bliss, and Bonham (1997) stated, "The provision of tutoring by well-trained tutors, as opposed to untrained or marginally trained tutors," distinguishes effective tutoring programs from mediocre ones (as cited in Boylan, 2002, pp. 49-50).

Exemplary tutoring programs typically involve both pre-service and in-service training for tutors with a focus on such topics as learning and motivation theory, communications skills, and adult learning theory (Boylan, 2002, p. 50).

Developmental education programs that emphasize ongoing professional development and training for both full and part-time faculty are significantly more

successful than programs that lack such an emphasis (Boylan, 2002, p. 46). Faculty who teach developmental students must remain abreast of "current research, theory, and practice" to refine their craft (Boylan, p. 46). Advisors and tutors, as well as instructors, benefit from professional development. Attendance at conferences, training institutes, and graduate courses provides valuable professional development opportunities (Boylan, 2002, pp. 46-47). Likewise, engaging faculty and staff in the reading and discussion of books and articles in developmental education, facilitating share-and-exchange sessions, and hosting external consultants promote professional growth. Boylan (2002) asserted, "Ongoing, long-term professional development programs" are considerably more effective than isolated, one-time events (p. 47). Best practice institutions promote such sharing by setting aside time for faculty members to discuss teaching and learning issues and by forming teams of instructors to exchange instructional strategies and techniques (Boylan, 2002, p. 93). Strategies can also be shared via online discussion forums or email. Distributing research articles among faculty on instructional strategies represents another way to exchange ideas.

In regard to faculty training and development, it is interesting to note that with the numbers of students failing developmental mathematics courses, most of those teaching developmental mathematics have backgrounds in mathematics or education, but they are not specifically trained in developmental mathematics. Breneman and Harrlow (1998) explained that much of the training faculty receive in developmental studies is in-service where professionals discuss their work with their peers. Boylan (2008) stressed that search committees should look to hire full-time faculty who have

experience and training in developmental mathematics. Research showed that more than 60% of the nation's community college developmental courses are taught by adjunct or part-time faculty (Boylan, Bonham, & Bliss, 1994; Shults, 2000), and, therefore, it is important that they also be included in any ongoing professional development and training opportunities. Additionally, national survey data suggested that far more part-time than full-time faculty are hired to teach remedial and developmental courses than to teach any other programs or courses (Roueche, Roueche, & Milliron, 1995). Indeed, the number of developmental courses being taught by part-time faculty is substantial, clearly revealing that the quality of teaching and learning encountered by developmental students is greatly influenced by this group of professionals.

Roueche and Roueche (1993) observed that what matters in the teaching of developmental courses is not whether those teaching are classified as full-time or part-time, but that they possess the right attitude and competence to help students succeed. The authors characterized the faculty best equipped to teach developmental education courses as (a) those who thoroughly understand a college's goals and the complexity of this at-risk population; (b) those who have significant classroom experience and a broad repertoire of teaching techniques; (c) those who enjoy working collaboratively with other faculty; (d) those who want to be involved in faculty development activities; (e) those who want to teach remedial courses; and, (f) those who believe that at-risk students can learn and be successful (p. 26).

While adjunct faculty are often assigned positions that directly support developmental students, background education and experience in the field of

developmental education may not be prerequisites for employment in those positions. As a result, many adjunct professionals begin their assignments underprepared for the work that they are asked to do. It is essential that institutions provide both the opportunity and incentive to support the professional development of their adjunct employees (Levine-Brown, Green, Hess, & Cabral-Maly, 2007).

A successful developmental education program, moreover, should incorporate well-coordinated formative and summative evaluation measures that are shared with faculty and staff to promote program improvement (Boylan, 2002). A detailed explanation of the program assessment and evaluation plan for FSCJ's ASCs is included in Appendix B. Boylan (2002) explained that "an industry standard" for evaluating developmental education programs includes the following criteria:

- Completion rates for developmental courses;
- Grades in developmental courses;
- Grades obtained in post-developmental education curriculum courses in the same subject area;
- Retention rates for developmental students;
- Grades in courses for which developmental students are tutored;
- Student satisfaction with courses and services;
- Faculty satisfaction with the skills of students who participate in developmental courses and services; and,
- Graduation rates for developmental students. (pp. 40-41)

Additionally, states have considerable influence over the performance indicators used to measure progress and the impact of state and institutional interventions. To improve outcomes, states and institutions should pay attention to intermediate measures and to milestones that developmental education students must pass en route to final success measures like graduation and transfer. Increasing knowledge of the relationship between intermediate measures and final success (e.g., graduation, transfer, and persistence toward a credential) can inform state incentives to help students meet shorter-term goals (Collins, 2009). With these measures, colleges can analyze their performance and compare themselves to other institutions.

Evaluating developmental education programs does not necessarily mean that a college must collect and analyze complicated data. The outcomes of the developmental education program should be described in the simplest way possible—i.e., bar graphs and pie charts—for the majority of people reviewing the results to understand the data (Boylan, 2002). Keeping in mind that institutional effectiveness is a way to determine quality improvement, accountability, and informed decision making, the data collected on a developmental education program and its students will enable administrators and faculty across a college to determine how well they are serving their student population.

The evaluation component of a developmental education program is an important part of any funding proposal. Most funding agencies want to see a strong combination of formative (used for the purpose of developing or improving courses or services) and summative (used to measure the outcomes of courses or services) methods employed in

evaluating a proposed program (Boylan, 2002). Instituting such measures should enable an institution to increase funding for its developmental education program and services.

While examining some of the major elements that need to be included in the successful redesign of developmental education programs, institutions should also take a closer look at alternative methods of course delivery. These alternative methods include the use of computer-assisted software, online and hybrid class settings, and modularized curriculum that can enable students to move from one course to another within a different time frame than what is presently permitted within the traditional classroom format (National Center for Academic Transformation [NCAT], 2008).

A shift in focus from teaching to learning has been emerging since the 1960s (Roueche & Roueche, 1993). Some of the most significant changes in instructional delivery include the use of computers in improving learning, teaching, and instructional management (O'Banion, 1989). However, the method of delivery for many developmental education courses takes place in a lecture-based classroom setting.

Developing a new delivery format does take time. Utilizing what is known about the needs of developmental students and effective practices should guide the design of these delivery formats. For example, it is well documented that developmental students frequently lack the necessary study skills and learning strategies to be successful. Assessing both cognitive and noncognitive skills of students, and integrating these into classroom instructional strategies or a lab, can promote the success of a new format. Research from NCAT (Twigg, 2005) suggested that course redesign could increase student success, while reducing instructional costs in college-credit and developmental

courses. A variety of redesign models have emerged. These include buffet, emporium, replacement, fully online, supplemental, and linked workshops (Jarmon, 2014). Courses targeted for redesign include those with high withdrawal and/or failure rates, those drawing from students with inconsistent preparation, those having difficulty getting qualified adjuncts, or those from which students have difficulty in subsequent classes (Bonham & Boylan, 2011). In addition, some institutions have used partnerships with other programs on campus, such as adult basic skills or adult literacy, individualized programs with required labs and external constraints, and integrated approaches using contextual learning related to a particular certificate or degree program, as ways to help students with very low reading, writing, and math skills (Boylan, 2002).

A number of redesign approaches have targeted developmental mathematics. According to Lucas and McCormick (2007), some approaches have accelerated developmental mathematics programs, other approaches have slowed the programs down, and still others have attempted to decrease the number of topics contained within the programs. While redesign is not specially targeted to developmental mathematics, the critical need of preparing students for postsecondary success makes developmental education a logical focus for course redesign.

While many faculty members at colleges enjoy using technology in the classroom and modularizing content, they do not necessarily want all remediation to be conducted on the computer. But, as former secretary of education Terrel Bell noted 20 years ago, it is necessary to recognize that some teaching practices are outdated, and the best possible use of technology in the classroom can improve the American education

enterprise (1991). The impact of various forms of technology and distance education on developmental students becomes increasingly more important as more colleges are experimenting with the use of technology in developmental education (Saxon & Boylan, 2003). Faculty must be open to identifying students who should be recommended for blended or online classes. How to deal with students with very low-level reading, writing, and math skills are also valid concerns that need to be addressed.

The review and use of appropriate affective instruments to determine which students have the necessary learning strategies and skills to be successful in a blended or online course is strongly advised (Levine-Brown, Bonham, Saxon, & Boylan, 2008; Saxon, Levine-Brown, & Boylan, 2008). Research dating back nearly 30 years discussed the importance of cognitive and affective factors in relation to the success of students in mathematics (Schoenfeld, 1983). Bandura's (1997) work in the area of social cognitive theory maintains that it is the students' beliefs about the value of the learning experience, their expectations of success, and their enjoyment of learning that will motivate them to engage material actively and persist in spite of initial failures. Bandura (1986) also pointed out that self-efficacy beliefs contribute to the choices people make, the effort they put forth, and the perseverance and persistence they display when facing difficulties.

High dropout and failure rates in developmental and remedial courses have resulted in many colleges making a concerted effort to redesign curriculum and delivery methods in these courses. NCAT (2008) issued reports showing that there is an increasing need for educational institutions to shift from the traditional paradigm that

normally holds steadfast to the concept that learning must be split into standardized semester-sized chunks that are delivered by an instructor to a group of students who are physically present when the lecture occurs. Additionally, requiring that students complete coursework in a specific sequence is extremely limiting in scope. This restrictive nature of traditional course delivery has created the demand for alternative ways to complete courses, ways that fit the learning needs of current students.

One alternative method of delivery that can meet the educational needs of students is modularized curriculum. This delivery method adheres to the lifestyle of many learners today, who are products of a fast-moving society that values time, productivity, and measurable results. These learners demand only what is necessary to the learning process and shun traditional student life distractions (Gibbons & Wentworth, 2001).

Learning a subject well requires intensive discourse, whether the field is math (Mokros, Russell, & Economopoulos, 1995), science (Gallas, 1995), social studies (Lindquist, 1995), literature (Brady & Jacobs, 1994), or any other discipline (Coulter, Konold, & Feldman, 2000). "The learners'…need for individual dialogue" contributes as much to the teaching and learning structure as the teacher offers, in the way of course content or design (Saba, 2000, p. 4). A modularized curriculum can provide an individualized one-on-one setting, where a student can dialogue with instructors while moving through a module at his or her own pace. One area in which students could benefit from a shift to this type of curriculum is in developmental reading, writing, and math courses.

The five principles of successful course redesign—namely, an emphasis on the whole course, the encouragement of active learning, individualized assistance, ongoing assessment and prompt feedback, as well as sufficient time on task and the monitoring of student progress—comprise the basis of this initiative. Supporting an assortment of individualized paths, the NCAT's (2008) buffet model of course redesign will customize the learning environment for each student. Integral to the initiative's success will be "research-based best practices in developmental education," including "the provision of comprehensive support services" such as "individualized instruction often supported by computers" (Boylan, 2002, pp. 26-27).

Students who may benefit from the modular redesign project are those who have been defined as nontraditional. For whatever reason, there are many nontraditional students who have delayed college enrollment for some time since their last connection to any high school program (Boylan & Saxon, 2012). Historically, these nontraditional learners have been defined as persons over age 25 (Whisnant, Sullivan, & Slayton, 1992). However, Knowles (1992) defined adulthood as "the point at which individuals perceive themselves to be essentially self-directing" (p. 46). Self-directedness is not necessarily correlated with age. While the age factor may be important in better understanding nontraditional students, the time these students spend away from academia (this is especially significant in relation to mathematics) increases the challenges that they must overcome in order to successfully complete a college degree (Adelman, 2006).

Nontraditional learners also require an alternative framework within which to learn. Knowles (1992) suggested that nontraditional learners need to know why they must learn something before deciding to learn it (Merriam & Brockett, 1997). This need suggests that the responsibility for learning be transferred from facilitator to learner. Facilitators of modular curriculum can learn to affect this transfer by training in the same collaborative learning model as their students: an experiential model that is learner-centered rather than instructor-centered, dialogue-based rather than lecture-based (Gibbons & Wentworth, 2001). Alternatively, traditional learners rely heavily on an instructor's knowledge, which is dispersed from a one-sided (teacher-to-student), lecture-based method.

According to Gibbons and Wentworth (2001), instructors have generally underutilized the experiences of traditional students as a resource for learning, considering these experiences are preexisting knowledge that merely provides a foundation upon which new knowledge will build. Nontraditional students brings a variety of life and work experiences to the classroom and are most responsive to learning models that provide an opportunity to apply theory to their experiences (Gibbons & Wentworth, 2001). Sharing of experiences openly and collaboratively within the context of the course material serves to enrich the learning process for students and their peers. Thus, those who facilitate the use of a modular curriculum can encourage a continual stream of dialogue concerning the subject matter in a constructivist atmosphere "where meaning is created in relation to students' prior

experience and knowledge" (Truman-Davis, Futch, Thompson, & Yonekura, 2000, p. 50).

**Theoretical Framework**

Theories can offer insight for working effectively with students and designing classroom experiences (Evans, Forney, Guido, Patten, & Renn (2010). As such, theoretical frameworks illustrate an understanding of theories and concepts that relate to the research in a study. After reviewing course readings and relevant research literature and theories, a theoretical framework for this study was selected that identified a number of practices in teaching that influence student learning. This framework, connected to a body of research in adult learning and higher education, provided the outline for analyzing and interpreting the date gathered

Lowman (1995) stated, "learning is most powerfully enhanced when an instructor stimulates students to care about their subject and work hard to master it" (p. 2). Joyce and Weil (1996) explained that educators design the environments in which students will interact. "If the transaction between the students and the environment is productive, learning results" (p. 49). Cross (1976) recommended looking at the concept of teaching through the lens of the seven principles for good practice in undergraduate education (Chickering & Gamson, 1987). Cross and Steadman further explained, "teachers should be lifelong students of the teaching-learning connection" (1996, p. 19).

Dedication to the belief that all students should have the "opportunity for high-level achievement" (Cross, 1976, p. 4), is a major consideration when working on the redesign of a developmental education program. A number of barriers to student

success, including low pass rates, lack of student persistence, and low completion rates of students in developmental courses are reasons to examine the restructuring of developmental education classes and the way these courses are delivered (Ciez-Volz & Levine-Brown, 2010). Establishing Academic Success Centers is one approach to redesigning a developmental education program. This approach can bring the institution's entire developmental education faculty into a centralized environment that reinforces the use of a variety of research-based instructional delivery formats, the infusion of technology, and additional training and professional development.

Figure 1 illustrates the redesign of developmental education courses within an ASC at FSCJ. The components emphasized pedagogical practices that focused on student learning outcomes.

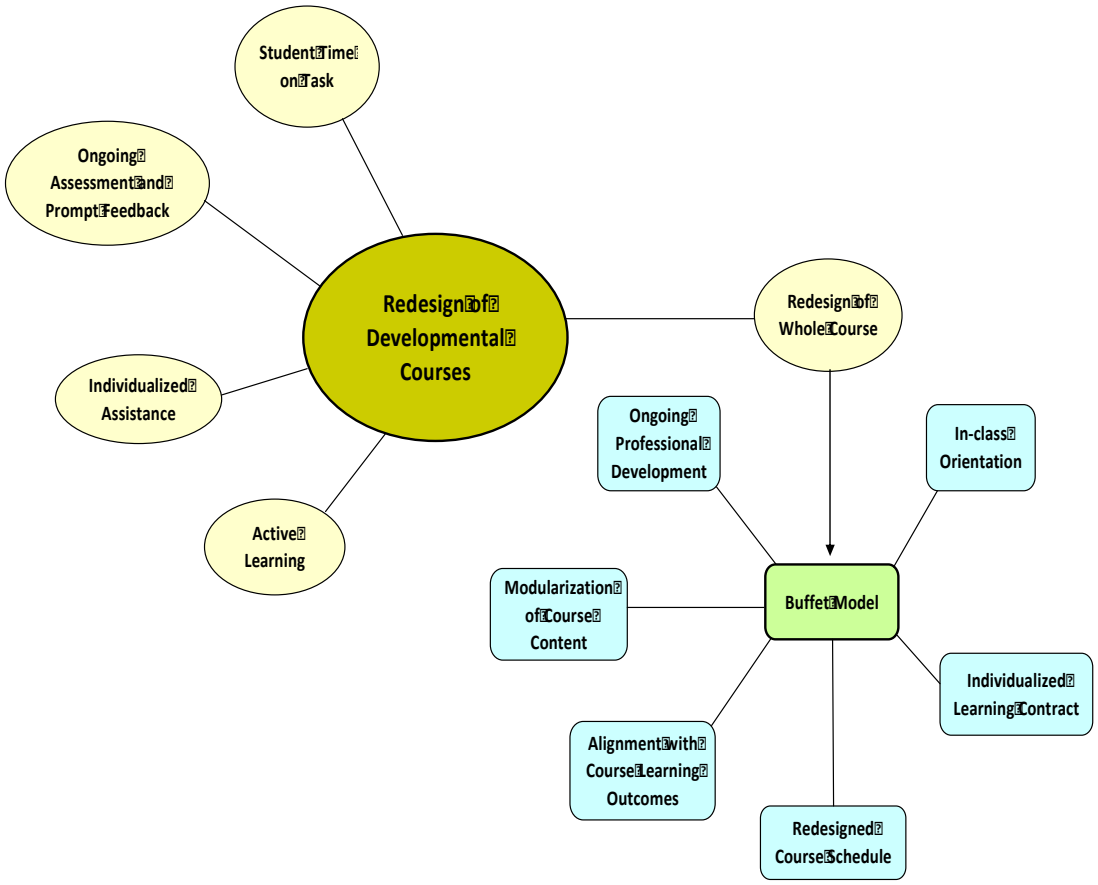


*Figure 1.* Redesign structure of developmental education in the ASCs at FSCJ. Adapted from "At the Crossroads of Change: Redesigning Developmental Education for Today's Learner," by K. Ciez-Volz and P. Levine-Brown, 2010, p. 47.

## Chapter Summary

Successful developmental education programs share a number of commonalities (Boylan, 2002). A review of the literature pertaining to pedagogical best practices and best practices in developmental education is discussed in this chapter. These best practices resulted in the establishment of Academic Success Centers at FSCJ. A program

model, such as the ASC, can be designed to promote active learning, provide ongoing assessment and prompt feedback, offer individualized assistance, and improve student time on task (Ciez-Volz & Levine-Brown, 2010).

Based on the research, a number of key elements should be incorporated into a redesigned developmental education program. These elements include a written developmental education philosophy (Kiemig, 1983), a coordination of developmental courses and services conducted by an administrator with primary responsibility for campus-wide developmental education (Boylan, 2002), the hiring of faculty members devoted to the success of developmental students (Roueche, & Roueche, 1999), an administration committed to the delivery of a high-quality developmental education program (Boylan & Saxon, 2012), the implementation of mandatory testing and assessment (McCabe & Day, 1998; Morante, 1989), a provision for advising and tutoring support (Maxwell, 1997), a required orientation program for students (Roueche & Roueche, 1999), the incorporation of integrated laboratory activities (Twigg, 2005), the implementation of a first-year experience course (Collins, 2009), the establishment of benchmarks of success in developmental education (Smith, 1985), a policy limiting the size of developmental education classes (MacGregor, Cooper, Smith & Robinson, 2000), a formal training program for adjuncts (Levine-Brown et al., 2007), alternative methods of course delivery, such as hybrid classes and the implementation of modular curriculum (Twigg, 2005), and the distribution of surveys, questionnaires, and interviews designed to gather information about what students think of the developmental education courses offered at the institution (CCCSE, 2010).

## Chapter Three: Methodology

Chapter two presented a review of the literature in developmental education. It emphasized the primary elements needed to implement a high-quality developmental educational and training program. This includes alternative delivery methods that can be used in the successful redesign of courses within a developmental education program that incorporate alternative approaches to teaching developmental mathematics.

Chapter three outlines the design of the study that focused on identifying effective classroom practices for developmental mathematics faculty and determining if there are commonalties among the practices used by faculty in the ASCs at FSCJ. Additionally, chapter three includes information on the research design used for the study, the data sources and analysis, location of the study, demographics of the institution where the study took place, a description of the participants, a restatement of the problem, a personal statement, and a summary.

### Research Design

To satisfy the purpose of the study, a qualitative research design and methodology was used that enabled examination of the perspectives and practices of six participants who were identified as highly successful developmental mathematics teachers by a predictive analysis study undertaken at the institution.

Willis (2007) explained that when conducting qualitative research, the evolution of the study is in the hands of the researcher, and "the researcher is the primary tool for data collection and analysis" (p. 203). Merriam (2002) stated that the key to understanding qualitative research lies with the idea that meaning is socially constructed

by individuals who are interacting with their world. In this particular study, it was essential that the researcher understood why participants use particular teaching practices in an ASC environment and what practices allowed more students in the ASCs to achieve success in their developmental mathematics classes. Since a large part of qualitative research involves developing questions and then asking those questions, the result of such research, according to Willis, is "often powerful stories that both inform and inspire" (2007, p. 244). While many forms of qualitative analysis exist, such as grounded theory, phenomenology, ethnography, and narrative analysis (Merriam, 2002, pp. 6-10), the researcher felt that the case study approach enabled her to gain a deeper understanding of the teaching practices developmental math faculty use in the ASCs.

Case studies typically include multiple data sources, including observations, structured or nonstructural interviews, and analyses of documents, historical data, and quantitative data (Willis, 2007, p. 241). Research on conducting qualitative studies indicates that the most common form of interview involves one-on-one contact, in which one person elicits information that cannot be observed, such as attitudes, feelings, intentions, and thoughts (Merriam, 1988). In this study, capturing information involved interviewing faculty with the highest success rates in developmental mathematics working in the ASCs at FSCJ.

According to Lincoln and Guba (1985), "The human-as-instrument is inclined toward methods that are extensions of normal human activities: looking, listening, speaking, reading, and the like" (p. 199); therefore, faculty working with students in the ASC environments were observed and syllabi given to students taking developmental

mathematics courses were reviewed. To play a key role in the qualitative research process, the researcher used eyes and ears to process information, view settings, collect data, and construct realities (Lichtman, 2006, p. 12).

**Case Study**

In the case study, data from multiple sources are brought together in the analysis process, and each data source is one piece of a puzzle, which contributes to the researcher's understanding of the whole phenomenon (Baxter & Jack, 2008). Willis (2007) explains that because this type of research seeks to gain insight and understanding of how people experience the world, the philosophical approach of this type of study is based on the assumption that human beings view the world they live in with unique perspectives, and there is something to be gained from exploring those perceptions. Interviews, observations, and document analyses are well-suited for this study, such as the information extracted from faculty teaching in an ASC environment about their teaching practices. Seeking this kind of information allowed for the discovery of how the philosophy and style of all the participants continued to develop as they learned new pedagogical approaches, adapted to changes in technology, adjusted to the changes of a new generation of learners, interacted with students in different class formats, and met students' needs through the integration of technology and the application of mathematics, as the subject applied to students' lives. Therefore, this study followed the guidelines described for qualitative research methods by acquiring information via classroom observations, interviews, and document analysis.

## Data Collection

Creswell (2007) explained that the researcher serves as a key instrument in a study where he or she collects data through examining documents, observing behavior, and interviewing participants. As such, this study was not reliant on questionnaires or instruments developed by other researchers. Using the survey questions designed by the researcher, data was gathered and findings were determined based on what was seen, heard, and understood by the researcher.

As explained by Lincoln and Guba (1985), "The human-as-instrument is inclined toward methods that are extensions of normal human activities: looking, listening, speaking, reading, and the like" (p. 199). In order to better understand the teaching activities practiced by the participants in this study, I gathered data about the interviewees in three different settings. First, I observed their interactions in open classrooms before I met them. Then, I talked with them inside the classroom. Finally, I interviewed them in private areas near their classrooms.

For each interviewee, I arrived early at the lobby outside the ASC lab classroom area. I noticed that the ASC lab classrooms were designed for open viewing, and I observed the activities of the participants that were already underway. I took notes on how each of the interviewees communicated in the classroom and how they used the resources available to them in the ASC to better assist them in teaching developmental mathematics. I watched quietly and made notes on interactions between the teacher and students, and between the teacher and other faculty. Because I had not met the interviewees, the participants were not aware that they were being observed. The

participants were continually on task acknowledging each student and providing assistance as needed. Participants appeared relaxed and comfortable in the open lab setting, and this behavior did not appear to change even after I entered their classrooms.

I transcribed the notes on my observational data (outlined in table 2), and coded the data separately from the interviews. I compared the coded results from each type of observation (outside and inside the classroom) and considered them so consistent that I grouped the data into one set. The data collected before the interviews began constituted about 30 percent of the data collected for this study.

The one-on-interviews with participants enabled me to gain more insight into how each participant viewed teaching and learning. During the interview sessions, participants were asked a series of questions that focused on their beliefs and behaviors about teaching practices in developmental mathematics. Additionally, reviewing such artifacts as course outlines and syllabi provided some insight into the practices and structure of their classes. To ensure that the data collected was accurately reflected, interviews were recorded digitally so they could be transcribed as precisely as they were given. Recording this information provided an accurate and in-depth understanding of the participant's teaching practices.

Additionally, a request was made for permission to use, distribute, and include the results gathered from observations and interviews with these participants who taught developmental mathematics in the Academic Success Center setting, and permission was also obtained from FSCJ to use and publish the information in the predictive analysis

study prepared by the institution's Office of Student Analytics and Research (Michalski, 2011).

**Data Analysis**

Hatch (2002) described data analysis as "a means of organizing and interrogating data in ways that allow the researcher to see patterns, identify themes, discover relationships, develop explanations, make interpretations, mount critiques, and generate theories" (p. 148). Through field research, a deliberate effort was made to discover the patterns and themes that were common among these highly successful developmental mathematics teachers who were working within the ASC environment. Personal interviews, classroom observations, and a review of course syllabi revealed common pedagogical and behavioral aspects among faculty.

Lichtman (2006) explained that the qualitative research process "moves back and forth between data gathering/collection and data analysis" (p. 15). To keep track of the data collected for this study, word processing files were maintained within which this information was classified, sorted, and organized during the time frame of this study. Merriam (2002) pointed out that there is no software program that can derive the various themes that cut across the data (p. 21). IBM SPSS Text Analytics for Surveys was used to convert unstructured survey text into data in order to gain insight into the emotions, feelings, reactions, attitudes, and opinions of the participants. By using natural language processing technologies to categorize responses and integrate the results with other survey data, clearer patterns and underlying themes surfaced that resulted in five key finding. This is a common practice that allows researchers to better see the patterns,

themes, and relationships that emerge and can be analyzed and interpreted (Crotty, 1998, p. 7). Coding categories were determined by word and term frequency as well as reviewing the responses of participants to the survey questions.

**Location of the Study**

Florida State College at Jacksonville was selected as the location for this study. Founded in 1965 as Florida Junior College, it was renamed Florida Community College in 1986, and in 2009 changed its name once again, when the institution was authorized by the Florida Legislature to offer 4-year degrees. Today, the institution is one of the largest baccalaureate colleges in the United States and serves more than 83,000 students a year. The College service area includes Duval and Nassau counties, although the College also draws students from neighboring Baker, Clay, and St. Johns counties. The College houses the largest workforce development program, information technology curriculum, and distance learning programs in Florida, and the institution is also the largest provider of undergraduate education to the U.S. Navy.

The College structure includes five campuses and seven centers. Its diverse student population mirrors the diversity of Northeast Florida. The majority of students at FSCJ pursue associate degrees or other career-training credentials. The remaining student population is enrolled in high school completion or basic education programs, special academic programs, or professional development classes (Florida State College at Jacksonville, 2013-2014a).

Florida State College describes itself as a value-driven institution of higher education committed to ensuring that every student has an extraordinarily positive

experience by providing excellence in teaching, high quality courses, services and learning environments, innovation and flexibility in delivery of courses and services, advanced academic technology, responsiveness to student, employer, and community needs, and encouragement and support of lifelong learning (Florida State College at Jacksonville, 2014). The college is a member of the Florida College System and is not affiliated with any other public or private university or college. The college is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to grant both associate and bachelor degrees. The institution offers university transfer, workforce, and continuing education programs, and its students can select from over 200 degree programs and technical certificates in a number of areas including arts, science, information technology, education, and business. The institution recently underwent reaffirmation of its regional accreditation (StateUniversity.com, 2013).

**Demographics of the institution.** Over two-thirds, or 68%, of the institution's student population attends school part time. Nearly 60% of the students are female, and the majority of these students (45.7%) list themselves as white/non-Hispanic. A little more than 30% of the student population describes itself as Black or Hispanic. More than 15% lists their race/ethnicity as unknown (Florida State College at Jacksonville, 2012-2013). In the 2012-2013 academic year, the institution reported an unduplicated headcount of 57,114 students, serving both credit non-credit students. The majority of FSCJ students are seeking associate degrees or workforce certificates. The remaining balance of the student population is pursuing a bachelor's degree, enrolled in high

school completion, or basic skills education programs (Florida State College at Jacksonville, 2014).

According to the institution's Office of Student Analytics and Research, during the fall semesters of 2011 and 2012, first-time-in-college students who had to take one or more developmental education courses before beginning their college credit courses averaged 62.5%. The total number of students, during the same semesters, who had to take developmental mathematics, was 11,498 or 71.8% (K. Stearns, personal communication, February 19, 2013).

Developmental mathematics classes are offered on all five major campuses of the College. Thus, the institution provides a rich setting for exploratory research. The study focused on seizing information that can explain how participants make meaning from their surroundings and how this meaning influences their behavior (Merriam, 2002). Hatch (2002) contended that, "part of the power of qualitative work is that it provides careful description and analysis of social phenomena in particular context" (p. 43). In qualitative research, the term context refers to the setting in which social interaction takes place, a set of participants and their relationships, and the activities in which the participants engage (Hatch, 2002, p. 44). The social interaction that took place within an ASC setting provided the opportunity to observe both a set of participants and the activities in which the participants engaged.

**Description of participants.** At the time this study was conducted, FSCJ offered two developmental mathematics courses. This study focused only on the developmental mathematics faculty who had the highest success rates in the upper-level developmental

mathematics course. The participants in this study were selected from a pool of faculty identified as highly successful developmental math instructors based on a predictive analysis study known as Chi-squared Automatic Interaction Detection (CHAID). The only role the CHAID played in this research was to identify the highly successful developmental math faculty that would be asked to participate in this study. This predictive analysis study, conducted by the Office of Student Analytics and Research, included student success rates in the highest-level developmental mathematics courses at FSCJ. The study examined differences in success and retention compared by course, course delivery method, term, course location, session length, faculty status, exit exam scores, and student demographics that included age, race, and gender (Michalski, 2011). Courses delivered via the ASC model were further broken down by delivery method as either: (a) two hours lecture and two hours lab (2+2); or (b) no lecture and four hours lab (0+4). Other variables included student demographics (age, race, gender), course location (campus/center), session length, faculty status (full-time or adjunct), and exit exam scores.

The participants who agreed to take part in this study varied by race, age, gender, instructional ranking (adjunct instructor and full professor), and instructional status (full-time versus part-time teaching loads). The age of the participants ranged from 29 to 66. The four males and two females also had a wide range of teaching experiences. One participant taught math at a another community college prior to being hired as a full-time math instructor at FSCJ, and two other participants previously taught math at local high schools before beginning their teaching careers at FSCJ. The three full-time faculty

members who took part in this study have collectively more than 35 years in the teaching profession. The three adjunct instructors who participated have collectively more than 15 years teaching developmental math courses at FSCJ. Two of these adjuncts are retired from the private sector, and one of them works is a full-time student success advisor at the College. To protect the privacy of those involved in the study, numbers were assigned to each participant (Table 1).

Table 1

*Overview of Participants*

| Participants | Years of Teaching Experience | Highest Degree | Teaching Rank |
|---|---|---|---|
| P1 | 5 or less | bachelors | adjunct instructor |
| P2 | 15 years + | masters | full professor |
| P3 | 15 years + | masters | full professor |
| P4 | 6-10 | masters | full professor |
| P5 | 5 or less | bachelors | adjunct instructor |
| P6 | 6-10 | masters | adjunct instructor |

**Restatement of the Problem**

Overall, mathematics seems to be the biggest barrier for a large percentage of the community college student population (Achieving the Dream, 2006). Mathematics can also be particularly challenging to institutions. According to Hall and Ponton (2005), mathematics is the subject having the strongest tie to student success in degree attainment. Approximately two of three community college students referred to a

remedial mathematics sequence do not complete it (Bailey et al., 2010). In a study, which included both 2-year and 4-year colleges, the completion rate for the full sequence of developmental courses was lowest in mathematics, at 21% (Schiel & Sawyer, 2002). Further, a regression discontinuity study that drew from a large Florida data set found little evidence of the effectiveness of developmental mathematics education (Calcagno, 2007; Calcagno & Long, 2008). According to a U.S. Department of Education study, the three courses with the highest rates of failure and withdrawal in postsecondary education are all developmental mathematics courses (Cullinane & Treisman, 2010). Studies using Ohio and Texas data reported similar results (Bettinger & Long, 2005; Martorell & McFarlin, 2010). Compounding these problems are the mounting frustrations expressed by students enrolled in developmental mathematics courses. Too many students find developmental mathematics to be an insurmountable impediment to their academic success (Merseth, 2011). Sierpinska, Bobos, and Knipping (2008) listed some of the frustrations articulated by students taking a university-level prerequisite mathematics course as lack of support from the college, lack of understanding from their instructors, disinterest of faculty teaching the course, and irrelevance of course material.

In addition, affective factors such as negative attitudes and low motivation regarding mathematics further inhibit student success (Ferren & McCafferty, 1992). These affective factors are connected to growing frustrations from students who are prevented from achieving their educational goals because they cannot complete developmental courses. Dismal completion figures are emerging at a time when national

programs such as ATD report that earning a postsecondary degree has never been more critical to getting a job that pays family-supporting wages (Collins, 2009).

In states participating in ATD, a multiyear national initiative designed to help more community college students complete courses, earn certificates, or transfer to other institutions to continue their studies, 60% of students are referred to developmental education courses. Of those who enroll, only 15% complete all of their developmental education requirements within the first academic year. Almost half—46%—do not complete any of their developmental education requirements in the first academic year (Clery & Topper, 2008). Taking these factors into consideration, many states have called for higher education institutions, primarily community colleges, to redesign developmental education programs. These directives, often due to pressures from the public and state legislatures, are now pushing colleges to address these students' needs early, in terms of their goals for attending college, to ensure that students are academically prepared to complete their educational programs.

**Personal Statement**

My previous professional experience includes 30 years of classroom teaching and knowledge of the community college setting and its students. The majority of this teaching experience has been in the area of developmental reading and writing at Florida State College at Jacksonville, an institution of which I am also a graduate. While having taught numerous courses in composition, literature, education, and student life skills, the choice to focus more time in the developmental education classroom has always taken precedent. In addition, I have spent much of my career serving on state and national

boards that promote programs and support research that advances the knowledge base and professional development of educators in the field of developmental education. It should be noted that I have research experience in the areas of professional development and training of developmental educators. I have also published research in the field on various topics associated with the design and implementation of developmental education programs and training of faculty on best practices.

As a developmental educator I have expressed concern about the growing number of students testing into developmental education courses and the numbers of students not completing these courses, and I understand the influence that teachers have on student learning. Therefore, I have a desire to examine what successful teachers do in their classrooms to see if common threads that run through their practices can be identified.

I also have a strong desire to contribute to the research FSCJ needs to help them better assist developmental mathematics faculty in improving student success and retention. However, research tells us that, "At every point in our research—in our observing, our interpreting, our reporting, and everything else we can do as researchers—we inject a host of assumptions" (Crotty, 1998, p. 17). The research also states that, "experience, knowledge, skill, and background" strongly shape the outcomes of a study (Lichtman, 2006, p. 12), and while my scope of knowledge and background in the field of mathematics is limited, my understanding and knowledge of developmental mathematics continued to grow tremendously. This growth experience made me even more mindful that my knowledge, background, and experience could influence this

study; therefore, measures such as the use of coding software and peer checking with a colleague were taken to increase the validity of this study. More importantly, I was committed myself to reporting my findings as objectively as possible.

**Chapter Summary**

In qualitative research, "It is important to understand the perspectives of those involved, uncover the complexity of human behavior in context, and present a holistic interpretation of what is happening" (Merriam, 2002, p. 25). I triangulated my research methods by interviewing, observing, and reviewing documents. In triangulation, the researcher makes use of multiple and different sources, methods, and theories to produce corroborating evidence (Creswell, 2007; Ely, Anzul, Friedman, Garner, & Steinmetz, 1991). These data collection methods focused on faculty with the highest success rates in developmental mathematics working within ASCs at FSCJ. I gathered information on these faculty members regarding their pedagogical and behavioral practices in developmental mathematics through interviews, observations, and review of course syllabi. Triangulating of the data enabled me to provide rich, in-depth descriptions of my findings.

# Chapter Four: Findings

## Introduction

The purpose of this study was to conclude if the participants shared pedagogical practices that contributed to student success and determine if environmental factors within the Academic Success Centers at Florida State College at Jacksonville impacted student success. At the time this study took place, success in developmental education classes at the institution was identified as completion of the course with a grade of *C* or higher and passing a standardized (state exit exam developed by the state of Florida) end-of-course assessment. Two research questions directed this study: (a) What are the pedagogical practices of developmental mathematics teachers who have the highest rates of student success? (b) What are the areas of impact of the ASCs as an environmental factor in student success?

As Johnson and Christensen (2012) explained, there is no single right way of analyzing qualitative data. In general, "qualitative data analysis requires coding and searching for relationships and patterns until a holistic picture can emerge" (p. 93). In searching for that holistic picture, the actions and voices of the participants were used to paint this picture. Participants in this study differed in instructional classification (full-time and part-time), years of teaching experience in a developmental education classroom setting, age, gender, and campuses on which they taught.

## Organization of Findings

Findings are presented based upon multiple data-gathering methods. The participants were chosen using longitudinal predictive analytics that showed that they

were statistically significantly ahead of their peers when comparing student success on common exit exams. From this point, a number of data gathering methods, including text mining, were used to determine patterns and trends common among the behaviors of the study participants.

Text mining involves the discovery of useful and previously unknown information from textual document repositories based upon patterns extracted from natural language (Zhang & Segall, 2010). The textual document repositories from which information was extracted for this study were derived from observations, interviews, and review of course documents. The data set generated from text mining, revealed in the form of a text analysis, produced word frequency distributions that identified five key areas where these faculty members shared common behaviors. Additionally, the areas identified revealed that a pattern emerged among participants indicating they shared common beliefs about the importance of communicating with students, forming relationships with students, lecture and lab practices, the availability of physical resources, and the availability of academic support services within the environment in which they interacted with their students and taught their courses. The evidence will be shared that led to the identification of the five key areas of this research. These findings are described in the following areas:

- Communication
- Relationship formation
- Lecture and lab relationship
- Physical resources

- Academic support services

**Organization of Chapter Contents**

Information in this section serves as evidence to support the study findings. Much of the information is presented in figures, graphs, and tables. A web model, displayed in Figure 2, illustrates the key areas common among the six faculty participants. Next, Table 2 lists the number of shared comments among the study participants in regard to the five areas. Figure 3 shows the percentages of responses from the participants in each of the five areas. Next, information noting the behavioral observations among the participants in the five areas (communication, relationship formation, lecture and lab formation, physical resources, and academic support services) is explained. Included in the information on behavioral observations is a series of figures highlighting actual text from participants' syllabi documenting additional support for the study findings. Lastly, sample comments from participant interviews are discussed.

**Significance of Information Generated Through Text Mining**

The information generated through text mining is significant because the process takes unstructured survey text that can sometimes be vague and uncertain and converts it into data that enables a researcher to better see patterns in the attitudes, beliefs and opinions of others. The information generated through text mining for this study is illustrated in three visual formats displayed as a web model, a table, and a bar graph. All three of these visual representations explicate the five areas of the study findings and highlight the number of comments participants made in reference to these areas.

The web model in Figure 2 illustrates the five areas of the study findings. The line thickness typified in the web model indicates that the majority of the shared responses from the participants fell into the areas of communication, relationship formation, lecture and lab relationship, physical resources, and academic support services.

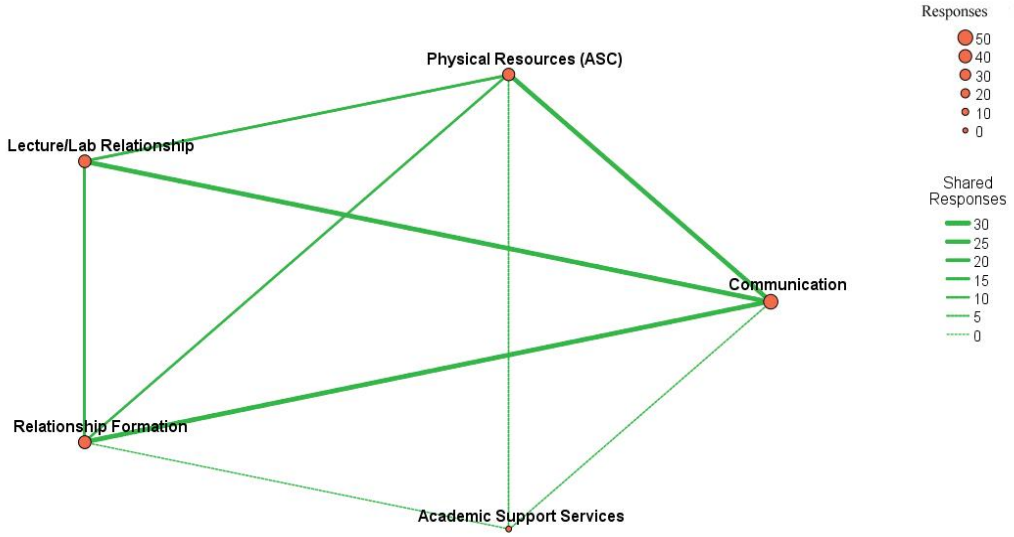


*Figure 2*. This web model shows five labeled nodes (categories) that represent the number of participant comments coded in each node. The relative line thickness represents the number of comments shared between nodes, emphasizing the areas in which participants shared the most common responses.

Table 2, generated by the IBM SPSS text analytics software, categorized the survey data and revealed the record count of participant responses in each of the five key areas. The five key areas are listed under the node title, which is how the software defines categories. The table also lists the number of shared or common records between the categories or nodes. The record counts of shared responses indicate that participants

made numerous references to the areas of communication, relationship formation, and lecture and lab relationship. The table further illustrates that there are a large number of shared comments in these three areas. While fewer participant comments fell into the areas labeled physical resources and academic support services, the total number of comments in these two key areas are significant to the overall findings of the study.

Table 2

*Participant Comment Record Counts Within and Shared Between the Category Nodes*

| **Category 1** | | **Category 2** | | |
|---|---|---|---|---|
| **Node Title** | **Record Count** | **Node Title** | **Record Count** | **Shared Records** |
| Lecture/Lab Relationship | 38 | Communication | 48 | 28 |
| Relationship Formation | 39 | Communication | 48 | 28 |
| Physical Resources ASC | 36 | Communication | 48 | 27 |
| Lecture/Lab Relationship | 38 | Relationship Formation | 39 | 13 |
| Physical Resources ASC | 36 | Lecture/Lab Relationship | 38 | 12 |
| Lecture/Lab Relationship | 38 | Physical Resources ASC | 36 | 10 |
| Physical Resources ASC | 36 | Relationship Formation | 39 | 9 |
| Relationship Formation | 39 | Physical Resources ASC | 36 | 9 |
| Relationship Formation | 39 | Lecture/Lab Relationship | 38 | 9 |
| Academic Support Services | 4 | Communication | 48 | 3 |
| Physical Resources ASC | 36 | Academic Support Services | 4 | 3 |
| Academic Support Services | 4 | Relationship Formation | 39 | 2 |

The bar graph in Figure 3 illustrates that of the responses given by participants, the largest percentage (72.7) centered on the area of communication. Additionally, 59.1% focused on relationship formation, 57.6% of the comments fell into the area of lecture and lab relationship, followed by 54.5% in the area of physical resources (ASCs) and 6.1% in the area of academic support services.

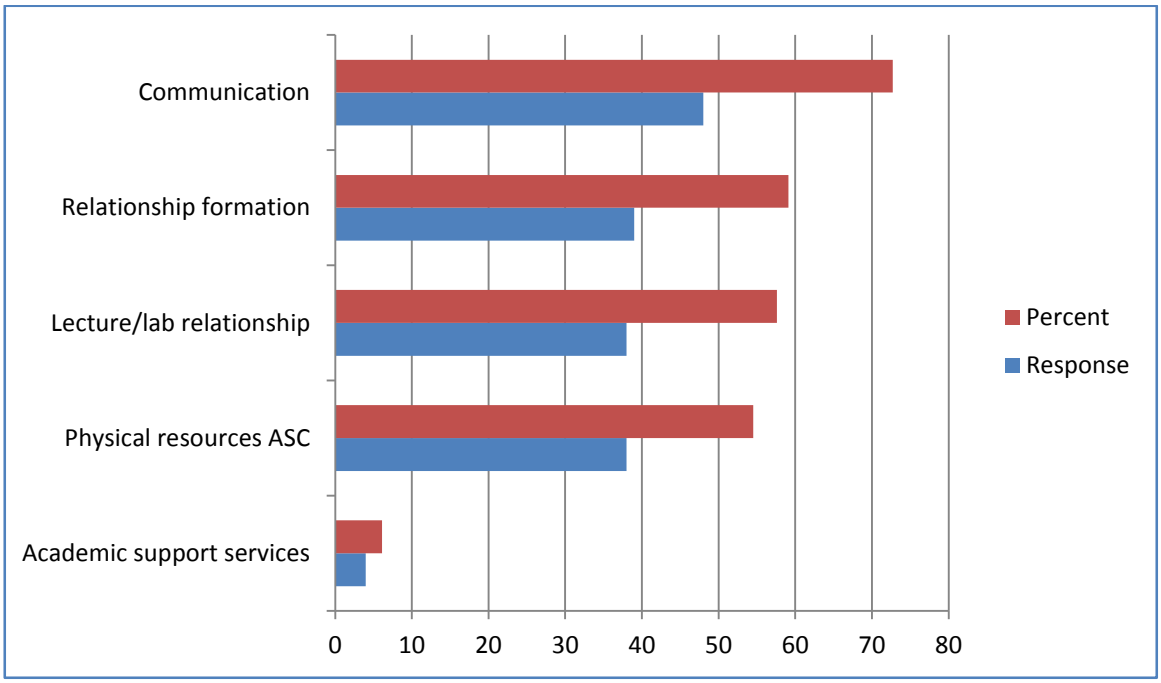


*Figure 3*. Bar graph showing percentages of participants' comments in the five key areas.

**Behavioral Observations**

The first phase of the study involved observing each of the six participants in the classroom and lab settings. The behavioral observations of the participants noted below fall into the five key areas identified as a result of the text mining. The five areas analyzed were communication, relationship formation, lecture and lab relationship,

physical resources, and academic support services. Table 3 displays the relevant behaviors noted and the resultant key area.

Table 3

*Behavioral Observations Noted In the Five Key Areas*

| **Behavior Noted** | **Key Areas** |
|---|---|
| Facilitated more than lectured | Lecture and lab<br>Communication |
| Communicated clear course objectives | Communication<br>Relationship Formation |
| Emphasized mastery learning as a tool for teaching | Lecture and lab<br>Communication |
| Emphasized one-on-one and small group discussion | Lecture and lab<br>Communication |
| Provided examples of problems both on the board and in active discussion | Communication<br>Lecture and lab |
| Offered considerable feedback | Communication<br>Relationship Formation |
| Helped students assess their progress | Communication<br>Relationship Formation |
| Worked comfortably in a lab-based setting | Lecture and lab<br>Communication<br>Lecture and lab<br>Physical Resources |
| Walked around the classroom/lab versus standing behind a podium | Communication<br>Relationship Formation<br>Lecture and lab |
| Used technology and other means to show students how to apply math to everyday life situations | Communication<br>Relationship Formation<br>Lecture and lab<br>Physical Resources |
| Helped students make sense of why it was important to learn math concepts | Communication<br>Relationship Formation<br>Physical Resources |
| Collaborated with a team of teachers from other disciplines to infuse reading and writing activities in the mathematics classroom | Lecture and Lab<br>Communication<br>Academic Support Services |
| Listed information about advising and tutoring services on the board and explained how students could benefit from these services | Communication<br>Academic Support Services |

**Communication**

As noted in Figure 2 and Table 2, the greatest number of shared responses among the participants fell into the area of communication. One observation emphasizing the key areas of communication within the lecture/lab environment was from participant three, a fulltime faculty member with more than 15 years of teaching experience. Walking around the lab classroom, the participant carried a clipboard with several pages of attached information. The first page was a diagram that included notations that laid out exactly where every student was in relation to the modules and quizzes that they were required to complete within the math software package. This enabled the participant to provide the students feedback on their progress. As the participant moved from student to student, sitting next to them when space was available, she provided detailed feedback and encouraged students to move forward. "Continue to stay on pace. I want you to make progress, and procrastination is a killer." Later, during the course of the interview process, this same participant explained the importance of keeping students on task. "Giving students feedback on a regular basis helps them see that they are making progress and also helps them build confidence in their ability to succeed and focus on completion."

Participants also communicated with students in writing. Participants' course syllabi listed their mobile and home numbers and email addresses, a welcome message (Figure 4), information regarding learning communities, information on the campus tutoring center and its hours of operation, contact information for advisers, and information explaining the Student Assistance Program.

**Welcome Message:**

Welcome and thank you for enrolling in this course! I think you will enjoy our time together! For some, this may be your first computer-based course. If you are not a computer whiz, don't worry. You don't need to be. From a computer standpoint, everything is simple to use and easy to navigate. Please take a few minutes to read the syllabus in its entirety. Exploring all topics in this syllabus and related links will help you succeed in this course.

I am look forward to working with you and having a great semester.

**Learning Communities**

Students learn through interactions with each other, with the instructor, and with written, auditory, and visual learning materials. To facilitate interactive learning among learners and between learners and faculty, a major goal of this course is to encourage the development of learning communities—i.e., to help learners and faculty get to know and better understand each other. Towards this end, the instructor will introduce herself/himself during the first week of class. You may be asked to introduce yourself to the class during the first week of class. You may be placed in groups of seven during the classroom lecture to encourage the development of learning communities.

**Student Assistance Program:**

Any FSCJ student who is experiencing personal problems that might affect him/her in or out of school can now receive free counseling through Corporate Care Works, Inc. Issues may include stress, conflict, family worries, financial/legal issues, and balancing work and home. This Student Assistance Program (SAP) is delivered within the Federal Confidentiality Guidelines and helps students solve challenges in a confidential manner. Additional program details are as follows:

24 Hour Problem Resolution
Confidential counseling from licensed professional
On-site crisis management

If you are interested in this service, please call (904) 384-1800 or see your ASC advisor for more information.

*Figure 4.* Examples of written communication included in the fall 2012 syllabi of all six developmental mathematics study participants at Florida State College at Jacksonville. These examples emphasize a welcoming tone as well as a concern for the wellbeing of students.

**Relationship Formation**

Observations yielded additional evidence on the ways participants used various communication techniques to form relationships with students in both the class and lab settings. The observed techniques recorded fell into the area of relationship formation:

- Called students by their first name
- Conversed openly and comfortably
- Smiled frequently
- Displayed a sense of humor
- Encouraged questions
- Shared their own challenges with teaching and learning math
- Provided words of encouragement such as "You can do this."
- Invited students to meet them outside of class

These techniques illustrate an effort on the part of the faculty member to create a welcoming and relaxed atmosphere in the classroom as well as a willingness to connect with students by offering words of encouragement and sharing personal stories about their own struggles with math. For example, participant five, an adjunct instructor with less than five years of teaching experience, explained that teachers expect many students have a fear of math. The participant then shared a story about failing math in high school. "I understand failure. When I took math in the ninth grade, I failed and had to go to summer school, but I learned to ask questions, and I ended up getting an *A* in that class."

Participant two, a full-time professor with more than 15 years of teaching experience, told students not to be afraid of math and encouraged them to work in groups with classmates to tackle problems. Smiling and laughing with students about the long-time rivalry between two college football teams, the instructor used examples of wins and losses to begin a short lecture on percentages. After the short lecture, the faculty member moved around the room conversing with students.

It was noted that all six participants engaged in conversations with their students about family, work, and other topics not necessarily related to math. Participants made numerous references to the importance of establishing relationships with their students as a way of increasing success and retention. Some comments in Figure 5 below exemplify how participants attempted to build relationships with students.

P1: "Helping them succeed to me is coming in with the right attitude. I listen, I understand, and we work around the issues."

P2: "Our population has great challenges, but success is that they must keep moving."

P3: "I try to help eliminate barriers for students."

P4: "I let students know I am here for them."

P5: "How is Joey? If you still need help getting him back and forth to appointments, the adviser is willing to provide you some additional bus passes. Just let us know what you need."

P6: "I try to build a relationship with my students so that I can joke and laugh with them because math is already intimidating enough as it is."

*Figure 5.* Data gathered from observations and responses to eleven survey questions asked in one-on-one interviews showed a strong desire on the part of these participants to build relationships with students enrolled in their developmental mathematics courses.

**Lecture/Lab and Physical Resources**

Research question two called for the examination of the impact of the ASCs as an environmental factor in student success. Kuh, Kinzie, Schuh, & Whitt (2005) stated that approaches to student success should address the physical environment of campuses and allow for the creation of space and settings where learning and teaching can flourish. The physical space and layout of the ASCs served as such an environment for students, faculty, and staff. The model for each campus incorporated a design that included open, airy, and brightly lit labs connected to smart classrooms equipped with computers, and projectors. Customized software packages were created for developmental mathematics students and master students were assigned to the developmental mathematics classes. Faculty incorporated mastery learning and served as facilitators versus lecturers within the 2-hour and 3-hour lab models. Some classroom observations noted regarding the impact of environmental factors of the ASCs in the key areas of lecture and lab and physical resources are outlined in Table 4 below:

Table 4

*Observations Noting the Environmental Factors within the ASCs and the Key Areas Identified as Physical Resources and Lecture/Lab*

| **Environment** | **Key Areas** |
|---|---|
| Large labs connected or near classrooms | Physical resources<br>Lecture/lab |
| Large work stations | Physical resources<br>Lecture/lab |
| Handicapped accessible | Physical resources<br>Lecture/lab |
| Large computer monitors | Physical resources<br>Lecture/lab |
| Adjustable lighting | Physical resources<br>Lecture/lab |
| Temperature controls | Physical resources<br>Lecture/lab |
| Comfortable, cushioned furniture | Physical resources<br>Lecture/lab |
| Round tables for Cooperative Learning groups | Physical resources<br>Lecture/lab |
| Smart classrooms | Physical resources<br>Lecture/lab |
| Faculty teams focused on helping all students | Physical Resources<br>Lecture/Lab |
| Availability of master students | Physical Resources |
| Emphasis on mastery learning | Physical Resources |
| Customized software packages | Physical Resources<br>Lecture/Lab |
| 1-hour Lecture; 3-hour Lab Model | Physical Resources<br>Lecture/Lab |
| 2-hour Lecture; 2-hour Lab Model | Physical Resources<br>Lecture/Lab |

Additionally, evidence in the course syllabi of the six participants made reference to availability of master students, customized software, and lecture/lab model (Figure 6).

> There will be 1-2 hours of lecture; your instructor (and possibly a Master Student or tutor) will be in the lab to help you learn how to use the computer and the software to assist you in learning math materials and passing the course. The instructor will provide the open lab hours for this class. By working in the lab 1.5-4 hours a week, you may earn up to 2% toward your final grade. Math XL records the amount of time spent working problems and navigating through the course. Since this is a self-paced class, you are encouraged to work at whatever pace is necessary to complete at least one chapter a week in Math XL.

*Figure 6*. Evidence of Lecture/Lab Model. Information included in all six of the fall 2012 course syllabi of developmental mathematics study participants at Florida State College at Jacksonville explaining the lecture/lab model within the ASC environment.

**Academic Support Services**

Research referenced in the literature review of this study discussed the important role that academic support services play in developmental education programs as well as the need for educational institutions to create spaces for learning. The environment (ASCs) in which these study participants taught was designed to bring developmental education students closer to the hub of campus resources and activities *(*Figure 1). In addition to housing academic support services such as advising, tutoring, counseling, and onsite technical assistance, workshops focusing on study skills for mathematics and time management were offered in the ASCs, labs were open additional hours to meet student needs, ASCs were located in close proximity to tutoring labs, the area provided

rooms for study groups to meet, and faculty and master students were available in the open labs to assist students. Additionally, course syllabi of all six participants listed ways for students to achieve greater success in developmental mathematics by emphasizing helpful tips (Figure 7).

- Have a place where you can study and set aside an appropriate amount of time to do it. Generally, a 3-credit hour course requires a minimum of 12 hours of self-study time each week in addition to the time spent completing assignments.
- Communicate with your instructor to ask any important questions and to discuss important concepts.
- Complete all reading assignments and view and review all chapter resources.
- Complete and review all online classroom activities.
- Stay ahead of the minimum pace.

*Figure 7.* Tips for Achieving Greater Success in Developmental Mathematics. Information included in all six of the fall 2012 course syllabi of developmental mathematics faculty participants at Florida State College at Jacksonville listing tips for achieving greater success in developmental mathematics.

Observations also yielded additional evidence about the physical environment within the ASCs and how it impacted the practices of faculty and the success of students. Guided by the second research question that called for examining the areas of impact of the ASCs as an environmental factor in student success, a number of notations were made regarding the design of the ASCs and how the design influenced practices that reinforced satisfaction with the learning environment:

- Close proximity to advising and counseling offices
- Student assistance services readily available
- Faculty offices in the ASCs
- ASCs in close proximity to tutoring labs and Library Commons
- Faculty in lab areas regularly to provide immediate feedback
- Time on task with subject matter
- Labs open additional hours to meet student needs
- Individual and group study rooms
- Study skills and time management workshops
- On-site training and technical assistance available
- Coffee bar and sandwich shop located in commons area
- Clubs and organization meeting areas located nearby

Observations indicated that the environment within the ASCs, designed as a dedicated lab space for developmental math students, had an impact on how students interacted with math and the time they spent on task while in the lab classroom setting. In addition to the availability of open labs during the morning, afternoon, evening and weekend hours, the ASCs provided an area where casual interactions among students, faculty, and staff could occur. While students were not interviewed as part of this study, one student talking with another student in the classroom commented that the ASCs "had opened the door for learning more than just math."

## Participant Interviews

The next phase of the study involved interviewing the six participants. Each of the participants was asked to respond to the same series of 11 questions. Creswell (2007) explained, "…the discussion of the research questions presents detail, context, and emotion by expressing the voices, feelings, actions, and meaning of interacting individuals" (p. 194). As such, the detail and feelings expressed in the participants' answers produced further evidence to support the study findings. The following responses illustrate some examples of the comments related to the five key areas.

### What do you perceive are the characteristics of student success?

Participant responses to question one regarding perceptions of student success included phrases such as helping *students prepare for life, communicating is important, attitude shift, and a matter of positive reinforcement*. Common threads within the text of the responses show concern for students' well-being, a willingness to help students develop good study skills and habits that will follow them throughout their college career, and a strong desire to see them succeed. The comments emphasize how these participants worked to communicate and form relationships with students.

P1: If I look at the class, I think success at this level with the developmental student is getting a student to (a) get organized, (b) become an asset to your class…become independent enough where they can take care of themselves without having to be hand-held. But it is also about me helping them get prepared for life. I learned this when I was in high school, but many of them are

still struggling. If I come in and my life personally is not firing on all cylinders, and I'm not coming in with a smile on my face that changes the entire tone of the class. It changes how I deal with things. There are times when you really want to read them the riot act and let them know that that issue that they're having is so minor in the scope of the world, but I have to understand that it is not a minor thing to them. Helping them succeed, to me, is coming in with the right attitude. I listen, I understand, and we work around the issues.

P2: I address the students, and what I tell them is, “You can't let good excuses keep you from your success. As you start this journey in developmental math, you're going to have things come up, so you're going to plan right now.” Our population has great challenges, but success is that they must keep moving. Also, I try to stress study habits like taking notes because that will help them be more successful.

P3: I guess one thing I would see as a characteristic is the student staying on pace. In my class, I really emphasize staying on pace. I emphasize procrastination is a killer. From day one, my first introduction, I talk about staying on pace. I emphasize that every week so I think that's very important, and it leads to their success.

P4: Student success for each student, in my opinion, is different. As far as being successful, I feel like all students need to have that desire. And communicating

that is important. That's definitely a characteristic. If you come to me and you have the desire to learn, then I do everything I can to help you.

P5: It's telling them about failure, and what I bring to them is failure. I tell them that when I took this class in ninth grade, I failed it. I had to go to summer school, and I had a bad attitude. And that teacher, Mr. Haymer, said, "You think you're a Pittsburgh tough guy because you won't ask questions. You'd rather sit there and fail than raise your hand to anybody." I said, "You're right." He said, "Well, that's the sign of a little boy. A man has the courage to ask questions. It's a shame you're not a man." I started asking questions. I got an A in algebra, and I went on to become a civil engineer."

P6: It's a lot more than a grade. It's maybe an attitude shift. I consider it a success if the student gets done with the class and maybe has lost some of the fear of math. I think it's successful when you change the attitude, it's all a matter of positive reinforcement, and it seems to work, if you give them a lot of positive reinforcement.

**What do you bring to the process of teaching developmental math that helps students be successful?**

In regard to participant responses to question two and the process of teaching developmental mathematics, note such phrases as: *engage my student; feel positive about the mission of learning math; I'm interested; I know what I need to do to get them back on track; I'm a little more encouraging and forgiving;*

and, *I try to build relationships*. The comments reflect not only the confidence these participants have in their knowledge of the subject matter, but also their self-assurance in working with developmental mathematics students and the impact their teaching has on student learning. These comments further emphasize how these participants worked to communicate and form relationships with students.

P1: I believe I am a better teacher. I believe that what I do makes a real impact on students. I think I really understand how to engage my students to the full extent.

P2: To help them stay focused. I want them to feel positive about the mission of learning math. I really like seeing them succeed. It's like a personal goal for me for every one of them to succeed. That's my target. My target is always 100%.

P3: I'm interested. I feel like I'm contributing to the betterment of somebody when I try to help eliminate barriers for my students.

P4: One special quality I think I bring is that I've been trained in education. Coming from public schools, I received a lot of professional development training. I use that training to focus in on what students are feeling. When I see a blank stare in a classroom, I know the student is coming with issues. I know what I need to do and to get them back on track.

P5: I'm a little more encouraging and forgiving. You don't give up on them. You never give up on them.

P6: I try to build a relationship with my students so that I can joke and laugh with them because math is already intimidating enough as it is.

**What techniques do you use to promote student engagement, success, and retention?**

Participant responses to question three regarding techniques used to promote student engagement, success, and retention included such techniques as: *one-on-one meetings; individualized tutoring; frequent communication with students; mini-lectures; an effort to reinforce engagement on a daily basis; eliminating barriers to learning; and helping students feel comfortable*. Techniques used by these participants demonstrate the ways in which they attempted to help students actively engage in the course material, thereby reducing the anxiety students feel about mathematics and helping them develop a sense of value for the subject matter. The varied techniques used by the participants fall into the areas of communication and relationship formation within the study findings.

P1: As far as engagement, the mini-lectures that I do, as well as the one-on-one meetings that I do each week with each student, that's first and foremost. The individualized tutoring is another one.

P2: I think number one is relational and the second thing would be my communication with students. Whether it be through e-mail, through the phone calls I make, through whatever it is that I do. I make a lot of calls from this office, whether they're my day students or my online students.

P3: I begin with a 10-15 minute mini-lecture at the start of class and make sure they get the flavor of what's happening, and then I let them work. I worked at how I needed to structure my classes so if students get stuck they do not have to wait for me to be finished with a lecture.

P4: I don't just engage them on the first day; it's reinforced every class we meet. I try to help them replace old habits with new habits, and that is hard.

P5: Getting them prepared for the next step. After they get through this, they're going to be well prepared. Again, I try to take a little bit of the fear out and let them know that its progressive, that's kind of my retention angle. I emphasize that everybody in this class has potential and they have the knowledge to finish. It just takes time. I want them to know that I think they can do this.

P6: Probably my relating to the students. It's eliminating that barrier from the front of the class to the seat of the class. I think when that's done, you've accomplished a lot. When they don't fear you as a faculty member, and they feel comfortable enough to just ask you about anything, that's when we start learning.

**What activities do you do on the first day of class to establish the tone for the remainder of the semester?**

Participant responses to question four regarding activities used to establish tone on the first day of class included *creating a positive learning environment in the classroom and lab setting; clearly communicating course objectives; encouraging students to get to know one another; providing students direction to*

*keep them on task;* and, *moving through the course materials.* These activities help students develop a sense of belonging and exemplify how these participants communicated and formed relationships with students from the very first day of contact with their students.

P1: The key to the first day is getting them in, spending a little time—maybe 20 minutes—on the syllabus, but more or less encouraging them…let's get started today, let's get you ahead and get them a little bit of positive reinforcement.

P2: I think you got to be patient with these folks because most of them don't like math anyway. You have to try to convince them that they can do this. From the first day, I try to make the environment for them as comfortable as I can, the least threatening, and just encouragement.

P3: That first day I just try to make it as laid back and relaxed as possible, to get rid of some of the fears and anxieties. I try to make that connection and let them know that I'm not some "queen above all" and I hold all the knowledge and I'm handing it out in small doses to everyone. No, think of us more as on the same level here, and we're going to have conversations about math.

P4: I do have them introduce themselves. Once in a while, I'll have them introduce the person next to them to the class, but usually it's just introducing themselves. I tell them that as their teacher I will come prepared to class, and I'll turn my phone off, and different things like that, and I want them to say "As your student, I will..." and they kind of mimic me on something.

P5: I talk to them about getting prepared and staying on target, they can do this. I put so much emphasis on that I don't do a lot of classroom time with other stuff. I know a lot of the other professors do and try to get a lot more personal atmosphere in the classroom about relating better. I don't worry about that initially. On the first day I have a PowerPoint that I go through and it explains that this isn't a traditional class where I stand up there and teach. This is an individual pace thing and so I go through all that and let them know that this is not a traditional class. I try to take away any fears of software and the computer.

P6: On the first day of class, I address the students, and what I tell them is "You can't let good excuses keep you from your success. As you start this journey in developmental math, you're going to have things come up, so you're going to plan right now." Our population has great challenges outside the classroom, but I work at educating the whole student. Helping them achieve success means that they must keep moving. I try to stress study habits like taking notes. I don't just engage them on the first day; it's reinforced every class we meet. I try to help them replace old habits with new habits, and that is hard.

**What special qualities do you bring to developmental math instruction?**

Participant responses to question five regarding special qualities and developmental mathematics instruction reflect ways participants felt about the uniqueness they brought to the developmental mathematics classroom. Personal reflections such as: *I let them know I am human*; *I can see potential roadblocks*; *I try intervening; I do many extra things*; *I understand where they are coming*

*from*; and, *I understand more about communication and relationships*, indicate ways these teachers fostered relationships with students and how they used various techniques to build on those relationships.

P1: It is important to let students know that I'm human, and they can approach me. I let them know I am going to be dedicated to you. I'm going to be here. I'm going to make a big effort to be here. I'm going to be on time. And you hope that they're thinking the same thing.

P2: I can see potential roadblocks, and I try intervening before they become a sinkhole.

P3: I do many extra things. I use YouTube videos. I do webinars with them. I use that Illuminate system...and then I record it. I also use a lot of the features that come with the software. In Math XL they have a button they can push that says "Ask my instructor," and it sends us an e-mail…and they can type in something, and it sends us the problem that they're struggling with, so we can respond back to them.

P4: Probably an understanding of where they're coming from because of my background in high school. So much of teaching developmental math is building a relationship and connecting with your students and I didn't learn that until about my third year of teaching high school. When I got here, I thought I could separate myself a bit more. I could at the college-level courses, but I find that in all courses, it doesn't matter what I do, there are students that maybe are not

struggling in the maturity level, and they're just struggling in general with life. I think I bring an understanding of what some of them are going through,

P5: I think it is that I understand more about communication and relationships with students. That goes a long way with instruction.

P6: A lot of what I bring is relational teaching math. It's not the math. It understands that even though your life situation is terrible, we can still get through that. I'm not holding you to some strict attendance policy right now because you have the ability to make it up. I think that emotional intelligence that a faculty member may possess or not possess, the stronger their emotional intelligence when it comes to working in this environment, I think the better they're going to do because it is so much about communication.

**What aspects of teaching developmental math do you find most difficult?**

Participant responses to question six regarding the most difficult aspects of developmental mathematics reflect how participants work around issues, inside and outside of the classroom, to help their students succeed. Participants talked about the use of a variety of resources and teaching techniques to help resolve these issues. Most noted were the comments related to working within a different environment (ASC). The environment promoted individualized tutoring, group activities, a focus on advising and counseling, and workshops on topics such as study skills and time management. Comments related to the environment within the ASCs fell into the area of lecture and lab relationship and academic support

services. These services included connecting students with counselors and advisors who could intercede in matters that may have prevented them from being successful in their developmental mathematics courses.P1: A lot more prep time is needed. I don’t do a lot of instructional time at the front of the room any more. I think that once I got through the idea of group instruction then I would revert back to moving around and helping individuals as they work through problems, so that much would be the same.

P2: We actually do have to train some students that there's a different environment here. We do some manners training at times, which is really odd, but you find yourself training them to become an adult. In addition to teaching math, you're focusing on unrelated stuff not connected to mathematics.

P3: The most difficult part about developmental [education] is dealing with the students would be excuses. They'll make an excuse for the devil. I don't understand that. I don't understand. If you really want something, do you make an excuse for why you can't? Or do you go for it and make it happen? It is also difficult to deal with the ones that don't come to class. They need to be here. Working at getting them to realize that they have the power and that they can do it. Sometimes I go home exhausted.

P4: A lot of times I'll end up counseling people—which, that is kind of difficult, too because some of this stuff is terrible. And I'm very soft-hearted. I'll cry at the drop of a hat. Tell me a sob story, and I'm just a puddle of tears. Stuff like that is

difficult for me. I call and e-mail and that kind of thing. I do try to find out something about the student. Somebody might be running a little bit behind, so I'll sit down with [him or her]. Sometimes I'll have a little calendar. “Here's what your day looks like. When are your hours that you're studying?” Help them figure out time management.

P5: That my developmental math students probably have more life issues going on than traditional college students. If you understand that and you can work around it versus the old days when we used to say “Maybe it's not time for you now. Maybe you ought to withdraw and come back next term.” But these issues take a lot of time.

P6: The issues I can't work around. That's why we now have the ASC adviser. Because when it comes to hearing, “I'm getting kicked out of my house. I have no money,”...right now I have a student that can't get $5 for his bus fare to come to class every day. Fortunately, I've kind of treated him like a half-online hybrid student. So now he comes once a week, because he has to take all of his tests here. He can't do them from home. We've been able to modify my attendance policy to meet his financials. So those things I can deal with. It's the other stuff—depression, the anxiety...I had a student last year hooked on Oxycodone. She had to go clean for the weekend, and she was a mess. Those are the challenges that you just can't address other than a referral. But that's what we have. We're faced with dealing with their individual circumstances.

**How do you address these challenges?**

Participant responses to question seven on addressing challenges of teaching developmental mathematics brought a number of the key findings into focus. Participants commented on how the environment in the ASCs helped them address challenges in the teaching of developmental mathematics. Participants specifically mentioned the advantages offered through professional development and the ability to work in teams with other faculty members. These faculty teams provided individual tutoring and small group learning sessions to all developmental mathematics students taking classes in the ASCs. Participant's references to creating a learning community within the ASCs, resourcefulness, and keeping the best interest of students in mind fall under the key findings of communication, relationship formation, lecture and lab relationship, and physical resources.

P1: We work using the team approach, and that helps reduce the challenges.

P2: I have been teaching a long time. I just stay focused and keep moving forward.

P3: I have learned to be more resourceful.

P4: I work well with the team approach, and that helps if I have issues with students. I also work at creating a learning community in my classroom and that seemed to cut down on the challenges.

P5: I have found professional development courses very helpful in addressing some of the challenges in the classroom.

P6: I just keep the best interest of the students in mind and do what needs to be done.

**How do you use instructional technology to facilitate student learning of developmental math?**

Participant responses to question eight regarding the use of instructional technology to facilitate student learning once again tied the areas of communication, relationship formation, lecture and lab relationship, and physical resources together. Participants not only commented on how they used the additional resources provided in the physical environment of the ASCs, but they also talked about the use of email and Blackboard to communicate with students and YouTube videos and other web resources to actively engage students. These faculty participants took time to show students how to successfully navigate through various websites that provided them with additional practice in the subject area of mathematics, paying particular attention to those students with disabilities who might benefit from outside resources.

P1: I think the technology is one that lets them feel more comfortable. With the software and the use of computers, particularly the older students, I try to get them to understand the technology. I've had as many as five wounded warriors from Iraq and Afghanistan in one class, and they've come in with brain injuries,

and they say they have no short-term memory. They understand what we're talking about in class, but they go home and they forget it. Their retention is very slow. Some of the older people say “I'd rather have you talking in front of the class.” I think one of the neat things is the more they get familiar with the computer as a tool, it opens up avenues outside just the XL software. I encourage them to go online. You might ask them “Have any of you gone online and seen this thing about...” some of the teaching programs might have mathematical implications. I'll challenge them: go outside of just what the course is. I am always asking if anybody can come up with an interesting website.

P2: Because it is developmental math, there's not a lot of technology I integrate. Now when you use the term “instructional technology,” I'm thinking calculators and fancy things, but if we're talking about YouTube, I just did five videos this weekend for my online students, and these are common questions that I get that for a student in the class I could demonstrate on the board. A student online, they have these packaged videos with the Pearson Product. So for them, what I try to do is give them a scope of the mini-lecture through a YouTube video. Five minutes covers three or four problems. I send them the link, and they watch it if they want and they don't if they don't. When I get a certain number of questions about a topic or a question in the software, I've used that in the last six months. We've just allowed the calculator in the course, so that's integrated, but there's nothing special about what I do and what anybody else does.

P3: I use YouTube videos. I do webinars with them. I use that Illuminate system...and then I record it, so if they can't come to that Illuminate session... I also use a lot of the features that come with the software. In Math XL they have a button they can push that says “Ask my instructor,” and it sends us an e-mail. It sends us an e-mail, and they can type in something, and it sends us the problem that they're struggling with, so we can respond back to them.

P4: I'm blown away that we've got this Starboard thing. That's gold to me. I also show them how to use all the features of the software. We have some tools in the Math XL system. One is “help me solve this,” and if they click on it, then it'll walk them through the problem, and at the end it gives them a new problem to work. Like “Okay, I showed you how to do that one. Now here, do this one.” There are some websites I try to steer them away from because it does way too much for them but things like Purple Math...those are pretty good. Cool Math for people who need games, especially for basic students who are still struggling with their times tables. That type of stuff helps them.

P5: I am always trying new things. We have a number of tools we can use. For me, I'd say it's all about trying to stay connected. A lot of the technology has done more for my world than anything else. It has made a big difference in the way I teach.

P6: A lot of the technology I'm using, whether it's an Outlook distribution e-mail list where I can put every address I have on file for them, it's simple, but that has

done more for my world than anything else. A lot of teachers would rather just go into Blackboard and click on "Send e-mail to students" and have that e-mail just go to their school accounts and expect that to be satisfactory, and yes, while we can demand that all students go to their school accounts, I'd prefer that my e-mail went to their phone and make that sound as soon as I send it, so they know I am checking on them on Wednesday night, Friday, whatever it might be, and that's a difference. That's one of the big differences that I do.

**What are your perceptions of the Academic Success Center?**

Responses to question nine describe participants' perceptions of the work environment in the ASCs. Adjusting to the new model was difficult for at least one faculty member and a little frightening for another. Frustration seemed to stem from the unknown, not being able to help students in a way that satisfied them as teachers. One faculty member did comment that despite not caring for the setting at first, the lab setting permitted students to come in, ask questions, and complete the coursework. Responses from participants on question nine fell into all five key areas: communication, relationship formation, lecture and lab relationship, physical resources, and academic success services.

P1: I found this model of teaching a bit difficult at first. No lecture was strange. When I first came to work here, I was a sub. I talked to the instructor and he said, "All you have to do is come in to class, take roll, and when they have questions, answer them. You don't have to lecture at all." So I went in there, I guess it was towards the end of the semester, I went in there for two hours, and it was the

most boring two hours of my life. I wanted to help, and basically the students came in and sat down and started working and got it done...I felt like a bump on a log. I told them “This isn't teaching. You could put a piece of concrete up on a chair and be as helpful as I was.” I guess I was not in favor of this at all.

P2: I love it. I love the fact that they can move ahead if they do know the stuff and just need a little review. We encourage them to move a little faster...all the resources that are available for them. It's fantastic to me. It has changed the way I do everything. I like the approach, and I think it has been a tremendous benefit to students.

P3: That's hard to say. I feel like how I said before...when I came to the college level I was coming from that traditional place where you didn't have all of the extras. It was a bit of a strain for me to get to the ASC type of teaching, but once I saw all of the benefits...it was just one of those things like where you get into the school system and you have those people that have been teaching for years and they don't want to change what they've been doing because they've been doing it this way, whether it works or not. I've been doing it this way, so I'm going to keep on doing it.

P4: Initially it scared me because it wasn’t traditional, and that’s all I knew. For me, it was one of those things where you see what's being asked of you, you try to make it fit, and you massage it so that it works in with what you're used to and your comfort zone, and over time you make it your own. I think that the soft-heartedness of my personality has an impact on my perception as well. Just my

desire for them to learn is so strong that...I want to help you. I tell them when they come in, once you're one of my students, you're always one of my students.

P5: It is a good place where students can have positive experiences. I can modify what I do to help students get ahead faster. I think it's very efficient, and it's very well organized. It's very accessible to the students because it stays open so late. I'm really advertising it all the time because I want them to come on in here where they have got people that can help them learn.

P6: For me, this environment has removed the barriers between me and my students. I actually have a better chance of engaging students in this environment. I know that all students learn differently, and the ASC really allows a teacher to work with individuals. We are not teaching hoping we hit some students; we are actually investing in each student personally. It took me a while to adjust to this model of teaching because I was accustomed to traditional approaches. Now that I have done it this way, I would not want to go back, and I don't think students would either.

**What are the specific differences related to student learning between the ASC and the traditional classroom?**

Participant responses to question ten regarding specific differences related to student learning between the ASC and the traditional classroom reflected all five key areas. Participants specifically mentioned how noticeable the differences were in the ASC setting, how they felt the environment promoted engagement

with students, and how such practices as mastery learning served as a motivational tool to help student persist and stay on task. Several comments referenced how the ASC created a centralized environment that brought faculty together who shared the same students and enhanced their relationships with all students.

P1: I learned to like the setup. It's conducive to learning because you [students] don't have to wait on me. One of the big differences is the use of mastery learning in these courses. It is a real motivator for a student to know they have another chance to improve on a test. Also the team approach with the other instructors is an advantage to our students.

P2: There is more academic support provided to students in the ASC than the traditional classroom environment. If a student has a problem, there is someone nearby who can help me find a solution. I like working with a team of teachers. I think we help more students working together this way.

P3: Students have opportunities in the ASC that are not available to them in traditional settings. The technology aspect makes it a different environment. I think that adds to the student's ability to learn.

P4: When you walk into this setting, you see a difference right away. Students are engaged and more on task. The setting is open and inviting and that can certainly increase learning. I have been in a number of classrooms that were dark, dreary, and cold. That distracts from learning.

P5: Faculty members share many of the same students in common – reading, writing, and math. We get to know the students well, and I think students become more comfortable with us and each other in the ASC. Also, there is more space for small group learning.

P6: The emporium approach to math is certainly different from the traditional classroom setting. Not lecturing as much was different, but it gives me more time to work with students individually and keep them on task. Working very closely with other faculty members that you personally interact with four or five hours a day is very different than what I was used to doing when I first came to the college.

**What is the impact of these differences on your teaching?**

Participant responses to question 11 regarding the difference the impact of working in the ASC had on their teaching supported the evidence that emerged in the five key findings. References to some initial fear and discomfort with a new environment was followed by comments of making the adjustment to the new model. Participants appeared pleased by the resources available in the ASC and how those resources helped them do more to stay connected to students. Participants also commented on how the environment within the ASC helped improve communication with students, form better relationships with students, and provided additional resources enabling them to do more for students. One participant credited the ASC setting with making them a better teacher. Research discussed in the literature review of this study referenced the need for an

institution-wide commitment that provides faculty with the resources needed to help developmental education students be successful. Numerous resources to accomplish this goal were incorporated into the design and implementation of the ASC model.

P1: Personally, the difference has a lot to do with the fact that we have a lot going on here in the ASC. Some students come with a plethora of information and so for them to be successful means they're getting the math, and they're being able to apply it in a number of different arenas. So, I am looking at a lot of different ways to help them with that. Doing less lectures and more work at the individual level certainly makes an impact. Also, I am teaching students who have a lot of outside issues. If somebody is making them come to school, and they don't put everything in, they don't show up to all of the classes, and they don't put that extra time in, all has an impact on how I teach.

P2: It has impacted the way I stay connected to students and that certainly makes a difference in teaching. I have more tools available to me to help students, and for me, that is major. I have taught in the high school setting, and I know what it is like not to have these marvelous tools available to you when you are teaching students who tend to have more difficulty with math.

P3: It has changed my approach with students. I want them to understand that they have to spend time outside of this class to learn math. This can be a difficult adjustment for students, especially the older students who haven't been in math in a while that...they're scared. They cry sometimes, and I was not accustomed to

that. I remind them that we're going to get through this. I tell them I am here to assist them and give them resources to help. I still find myself reminding them what those resources are and that is a different approach for me. I spend a lot of time trying to get them to stay organized and focused.

P4: When I first started here, I was an adjunct, and I was afraid to let go of what I knew from the past. People would come by my room and go “What happened in here?” I'd have something written on every single whiteboard and every corner. The class setup was a little bit different then because we would...like today would have been all lecture and Thursday would be all lab. Having a lab available and encouraging students to use it has made a difference in the way I teach. I know some teachers in the traditional classroom have students sign a sheet every time they walk into class. I know which students are here, and I’m not like that. They are adults, and you need to treat them as adults. I taught high school before coming to the College. Teaching adults makes a big difference to me.

P5: It has had an impact on my emotional intelligence. I have a stronger emotional intelligence from working in this environment. I understand more about communication and relationships with students. It has taught me about software and all the tools we can now give students. It helped me better understand how it could help students learn by providing them the ability to move at their own pace. It has given me the opportunity to provide students with tools that I know they can use such as a textbook that they can read.

P6: I believe it has made me a better teacher. I pay more attention to things about the student than I did when I taught in a traditional setting. It really allows me to engage my students to the fullest extent, and to me, that equates to learning.

**Summary of Study Findings**

In this chapter findings discovered from data collection were discussed. This study involved the triangulation of data to gather information to answer two primary research questions. Through observation, interviews, and review of course documents of the six study participants, a number of themes and sub-themes surfaced during the coding and analysis process about their perceptions and practices of developmental mathematics and the classroom environment in which these practices were conducted. The application of text mining in the coding process revealed additional details concerning the beliefs the participants shared in common regarding student success; the process of teaching developmental math; techniques used to promote student engagement, success, and retention; aspects of teaching found most challenging; special qualities brought to teaching developmental math; the use of instructional technology to facilitate learning; perceptions of the ASC; role the ASC played on their teaching; differences experienced related to student learning in the ASC versus the traditional classroom; and, the impact these differences had on their teaching.

Having the study participants elaborate on these points provided a clearer understanding of how these teachers defined student success; techniques they used to motivate students; how they built relationships with students; how they established tone in the classroom; how they addressed challenges in the teaching of their subject area;

how they helped students address the challenges in learning math; and, how they facilitated learning.

Rich data was presented in chapter four. In chapter five, a discussion of the study's implications and recommendations for future practice and research will be offered.

# Chapter Five: Conclusions and Recommendations

## Introduction

The purpose of this qualitative study was to examine the pedagogical practices of six highly successful developmental mathematics instructors at Florida State College at Jacksonville and to determine what factors within the environment where they taught impacted student success. Through observations, interviews, and document analyses five areas emerged that offered insight into the pedagogical practices of these participants and how the surroundings in which they taught influenced the learning environment.

Much like a conductor who leads an orchestra through a performance, a teacher leads students through a learning process. However, the conductor, whose talent and creativity leads him or her to search beyond the notes on a sheet of music to find a way to turn an average performance into a masterful performance, is regarded as a maestro. Like the maestro, extraordinary teachers find ways to provide students with additional resources and support that enable them to do more than just master the content in a course. Exceptional teachers help students make connections with the content that can be applied beyond the classroom walls. Such is the case with the six developmental mathematic teachers who participated in this study.

## Summary of Findings

Overall findings in this study revealed that this group of teachers did much more than show up and go through the motions of teaching. Their teaching practices involved more than just having students memorize equations. These teachers were passionate about mathematics and about students learning mathematics. They encouraged

discussions of mathematics in their classrooms and stressed how mathematics related to the everyday lives of their students. These participants dug deeply into the pedagogical practices of teaching and found ways to orchestrate pathways that resulted in more students successfully completing their developmental mathematics courses.

Observations, analysis of interviews and review of course documents in conjunction with the use of text mining, determined the key findings in this study. The findings provided detailed information about what these successful teachers did, how they did it, and how working with one another within a physical facility that was equipped with resources and academic support services that included tutoring, supplemental instruction, and computer assisted technology, gave them the tools they needed to assist students in successfully completing their developmental mathematics courses.

In discussing education in America, Rose (2005) explained that what matters most to students in the classroom are the relationships teachers establish with their students. Common among all six of the participants in this study was the efforts they made to form relationships with their students, going as far as to assist them with resolving external issues that could have prevented them from successfully completing their courses.

Observations of these teachers in the lecture and lab classroom settings revealed that they had exceptional knowledge and comfort with the subject matter, possessed a welcoming attitude toward students, had the ability to reduce fear and anxiety associated with the course material, worked to build students' self-confidence in their ability to be

successful, clearly communicated course expectations both verbally and in writing, and worked to create a positive and upbeat atmosphere in their classrooms. The practices all played a part in how students appeared to respond to math.

In conducting this study it was important to understand how the physical environment within the Academic Success Centers (ASCs), designed as a dedicated space to provide additional support to students enrolled in developmental education courses, impacted the practices of faculty and the success of students. Guided by the second research question that centered on ways the environmental factors within the ASCs impacted student success, evidence emerged that the participants were more satisfied with the learning environment. This study did not involve student interviews, but it was evident through observation that students were spending a good deal of class time on task and they were actively engaged in practicing and reviewing mathematics problems, skills, and concepts. One student was heard saying, "This lab has opened up a new avenue for me to learn math."

By providing developmental mathematics students with a dedicated lab space and a customized software package that reinforced concepts and skills taught in the classroom, the ASC environment had an impact on how students interacted with math and the time they spent on task while in the lab classroom setting.

**Recommendations for Future Research**

The findings from this study suggest a number of implications for future research. Research cited throughout this study revealed that overall mathematics seems to be a barrier for a large percentage of the community college student population

(Achieving the Dream, 2006). This was the case at FSCJ, where failure rates in developmental mathematics courses presented problems to both the institution and its students. Additional research stated that approximately two of three community college students referred to a remedial mathematics sequence do not complete it (Bailey et al., 2010). If large numbers of students are prevented from achieving their educational goals, as they were at FSCJ, because they never complete their remedial mathematics courses (Bonham & Boylan, 2011), and failing to complete developmental math and required college-level math prevents individuals from earning a college degree and pursuing certain professions (Hodara, 2011), then community colleges and other educational institutions that provide developmental education could benefit from examining the findings in this study that indicate that forming partnerships, pooling resources, and sharing workable solutions can help students successfully complete developmental mathematics courses.

Additionally, conducting more comparative studies on educational institutions where a commitment has been made across the institution to provide resources similar to those available within the Academic Success Centers at FSCJ could prove beneficial. Findings in this study show that even if institutions can only implement some of the resources that were provided within the ASC model, valuable information could be collected about developmental mathematic practices that show promise. As Boylan (2002) pointed out, studies of the Nation's most effective developmental education programs can offer ideas and concepts that could be applied by any college with a serious interest in improving developmental education.

Those concerned about tackling the mammoth problems presented to students who do not complete developmental mathematics courses could be looking at more institutions with proven track records of student success in developmental mathematics. The findings in this study discuss how those who designed and implemented the developmental education program at FSCJ examined the research to ensure that the elements of the program had been tested at other institutions across the nation. In the years that the ASC model has been in existence, numerous representatives from educational institutions across Florida and around the country have visited these centers and met with faculty members to discuss the application of its design. Whether large or small, any institution with numbers that suggest they are doing something well should be examined. More importantly, in examining those successful institutions, researchers should be mindful of observing and talking with faculty who, as the evidence in this study suggests, have a positive impact on student success.

After decades of research on the role teachers play in student success, Pascarella and Terenzini (1991), have provided evidence, such as that revealed in this study, that faculty contribute to student success in a number of ways including both social and academic supports inside and outside the classroom; therefore, faculty possessing a desire to help students succeed, who engage their students by utilizing creative and innovative teaching practices, who offer encouragement on an ongoing basis, and who help build students' self-confidence with the subject matter, should be considered a highly prized commodity. Future professional development models need to incorporate information on practices used by highly successful developmental mathematics teachers.

These practices can be used across the discipline to train all professionals who teach mathematics.

It would also prove beneficial for more research to focus on examining what the experts in the field of developmental education, as well as the faculty participants in this study, recognize concerning the need for ongoing professional development training for all full-time and adjunct faculty who teach developmental education courses. Faculty who were interviewed for this study stated that professional development offered through the ASC model helped them meet challenges they faced in the developmental mathematics classroom. This study suggests that expecting higher success rates in developmental mathematics without supplying teachers with the training and resources needed to accomplish the task is akin to setting both the developmental mathematics teacher and the developmental mathematics student up for failure.

Additional research is needed on the benefits of centralized versus decentralized programs in developmental education. The successful design of future programs depends on research that can guide those charged with creating and implementing these programs. This is the case at FSCJ where a centralized program is staffed by faculty who are dedicated to serving the developmental education student population. Specifically related to the second research question in this study, findings revealed that faculty who work in an environment where the administration is willing to make an institution-wide commitment to provide resources that will assist them in creating an engaging classroom environment, will see more students completing developmental mathematics courses. Information included in the literature review of this treatise from noted experts Boylan

(2002), Donovan (1974), and Roueche and Roueche (1999), also supported the premise that centralized developmental education programs have been found to be more successful than decentralized programs. Boylan (2002) explained that even if the limited resources of an institution prohibit the establishment of centralized program models, it is better if developmental education courses and services coordinated. An institution-wide commitment to coordinate services and provide additional resources to underprepared students was the premise on which the ASC model at FSCJ was designed.

Finally, more research is needed on ways to engage developmental education students inside and outside the classroom. This study yielded evidence that increased engagement in developmental mathematics classes can lead to more students successfully completing these courses. Roueche and Roueche (1993) stated that it is important for staff, faculty, and administrators to constantly connect and engage community college students in order for them to be socialized and acculturated into postsecondary educational institutions. Achieving increased success for developmental mathematics students who take courses in the ASCs at FSCJ begins by continuously engaging them at every point of contact (Center for Community College Student Engagement, 2008).

**Recommendations for Practice**

Recommendations in this section are derived from both the evidence that emerged from this study and the research discussed in the literature review outlined in chapter two of this treatise. It is important to note that teaching in the Academic Success Center setting at FSCJ represented a paradigm shift in teaching and learning, and the

application of technology. Capitalizing on a rich research base of pedagogical approaches to instructional design is grounded in multiple theoretical principles. Motivation theory, mastery learning, constructivism, and cooperative learning were practices used in the ASCs. These research-based principles can be woven through a course design, resulting in instruction that promotes student success.

A practice that FSCJ has put into place requires developmental education students to attend mandatory advising and orientation sessions. Over the years, a number of institutions have veered away from requiring developmental education students to attend advising and orientation sessions, but faculty participants in this study attributed this practice to helping students identify and develop their educational and professional goals. Appropriate advising and orientation is the result of a carefully developed institutional plan and a commitment to student success such as what was implemented at FSCJ, which has continued to assist the institution in placing developmental mathematics students on the right pathway for completion. Roueche and Roueche (1999) supported required student orientations, noting that universities are far better at this practice than community colleges. Boylan and Saxon (2002) concurred that students who participate in orientations are more likely to be retained in community college than those who do not.

Future endeavors by those designing and implementing developmental education programs should include embracing more of the research practices that have been discussed in the field of developmental education. A number of these research-based practices reviewed by those who designed and implemented the ASC model at FSCJ

have a proven track record of success within developmental education programs. Observations and interviews conducted for this study produced evidence that the faculty who participated in this study used many research-based practices that did indeed result in more students successfully completed developmental mathematics classes. While these practices may not be considered innovative or cutting edge by some, it does not mean that they will not work well in various educational institutions across the country. For example, research in the field of developmental education has consistently reported that infusing technology can enhance the delivery of course materials. Noted educator and author Terry O'Banion conducted research more than 20 years ago emphasizing that significant changes in instructional delivery included use of computers to improve learning, teaching, and instructional management (O'Banion, 1989). Customized technology was a major part of the curriculum designed for developmental mathematics students who took their courses in the ASC. Faculty who participated in this study commented on the ways that instructional technology can facilitate learning in the developmental mathematics classroom.

More attention needs to be paid to the practice of working with non-traditional learners and the programs designed to fit the needs of these students. Many developmental education students taking classes at community colleges, including FSCJ, are nontraditional learners. Comments from the faculty interviewed for this study reference the fact that the developmental education student population is a special population that has special needs. Evidence in this study found that the faculty who took part in the study looked for ways to meet the needs of non-traditional students. As

Knowles (1992) suggests, these nontraditional learners require an alternative framework for learning and they must know why they need to learn something before deciding to learn it (Merriam & Brockett, 1997). This need suggests that the responsibility for learning be transferred from facilitator to learner. Facilitators of modular curriculum, such as the faculty who were interviewed for this study, can learn to affect this transfer by training in the same collaborative learning model as their students: an experiential model that is learner-centered rather than instructor-centered and dialogue-based rather than lecture-based (Gibbons & Wentworth, 2001). Utilizing what is known about the needs of developmental students and best practices should guide the design of these delivery formats. The needs of the developmental education student population at FSCJ were the underlying factor in guiding the design of customized, modularized curriculum used in facilitating developmental mathematics classes taught in the ASC at FSCJ.

Another recommendation for practice, based on the evidence that emerged in this study, is the use of thematic instruction in developmental mathematics courses. This strategy of organizing instruction around themes or anchors provides a way for learners to link prior experiences to new experiences. Developmental mathematics courses delivered in the ASC environment addressed relevance and clarified abstractions with concrete examples in both the faculty-authored text and supplementary online learning objects. The evidence in this study revealed that these successful faculty participants made an effort to make learning a social process that incorporated curriculum that is realistic, relevant, and meaningful (Schunk, 2000). These principles correlate with

constructivism, an underlying pedagogical philosophy of the Academic Success Centers at Florida State College at Jacksonville.

Consideration should be given to the importance that motivational practices, especially mastery learning, can have on helping more students succeed in completing developmental mathematics courses. According to Keller (1983), for learners to be motivated and persistent, certain conditions must exist. Keller developed the ARCS (attention, relevance, confidence, and satisfaction) model, which describes the conditions necessary for sustaining learner motivation. One of the most influential research-supported instructional and motivational strategies central in the Academic Success Center model is Bloom's (1971) mastery learning concept. Faculty participants in this study commented on the use of mastery learning and the positive effect it had on promoting confidence, satisfaction, and persistence in developmental mathematics courses offered in the ASC at FSCJ. Roueche and his colleagues emphasized mastery learning as a component of effective remedial instruction (Roueche, 1968; Roueche & Wheeler, 1973). Additionally, research by Cross (1976), whose work was used to support the theoretical framework of this study, as well as the work by Kulik and Kulik (1991), strongly support the use of mastery learning in remedial education.

Developmental mathematics students should be introduced to the practice of participating in structured online discussion, collaborative online activities, online assessments, and interactive course material as ways of promoting constructivism (Gulati, 2008, p. 184). This approach was infused into the curriculum used in developmental mathematics courses in the ASC. Participants in this study indicated that

incorporating discussion forums in their developmental mathematics classes helped students better understand the relevance math had in their everyday lives, and it was especially helpful in encouraging student interactions with their peers.

Priority should be given to incorporating varied instructional practices into developmental mathematics classes, especially those that emphasize critical thinking. As evidence from this study suggests, incorporating critical thinking skills, mastery and active learning techniques, and teaching learning strategies can be beneficial to developmental education students (Harris & Eleser, 1997; Kulik & Kulik, 1991; McKeachie, 2002). Study participants referenced that the practices they incorporated into the ASC environment promoted critical thinking and active learning, two practices that helped motivate and build the confidence level of students taking their developmental mathematics classes.

Teachers working together in teams was a major part of the design within the ASC environment. The second research question posed in this study examined the areas of impact of the ASC as an environmental factor in student success. Faculty participants in this study stated that the ASC environment provided them with the opportunity to meet and share ideas and tips on teaching methods and strategies with other faculty members. Some of the teaching strategies and practices mentioned by the successful developmental mathematics teachers who took part in this study included group discussion, group projects, supplemental instruction, infusion of technology, and the development of learning communities. Essentially, the ASC served as a learning community. Evidence revealed in this study showed that the practice of organizing

students as cohorts and arranging for the courses to be linked together by a common theme (Adams & Huneycutt, 1999) did have an impact on the success of developmental mathematics students who were enrolled in classes with these highly successful developmental mathematics teachers. Tinto (1997; 1998) stated that when underprepared students, such as those who were enrolled in developmental mathematics courses in the ASCs at FSCJ, participate in organized groups, retention rates rise and overall attitudes improve. By emphasizing pedagogies such as cooperative and problem-based learning that stress engagement, all of which were incorporated into the classes taught by these highly successful developmental mathematics teachers at FSCJ, students were able to collaborate and form social bonds that these teachers felt contributed to building the confidence level of students and establishing a more positive outlook about the subject matter these students were interacting with on a daily basis. The syllabi of those developmental mathematics faculty who participated in this study included an emphasis on creating a learning community environment within their developmental mathematics classrooms. One participant directed me to the research on learning communities and the following statement. “In their fullest implementation, learning communities not only change the manner in which students experience the curriculum but also the way they experience learning” (Tinto, 2011, p. 5).

Supplemental instruction (SI) should be a practice that institutions provide to help improve the performance of developmental mathematics students. Arendale (2003) indicated that students who participate in SI consistently obtain higher course grades than students who do not. Boylan, Bonham, Bliss & Claxton (1992) reported that

developmental programs with the highest rates of student retention regularly used SI to support students enrolled in difficult courses, and Ramirez (1997) found that developmental education students who participated in SI had greater long-term retention. Master students who deliver SI to developmental education students at FSCJ are important to the faculty members who participated in this study. Evidence emerged in the study findings through participant comments, primarily in the key areas of lecture and lab relationships, physical resources and academic support services, that access to master students was important to the success of their developmental mathematics students.

Consider making it an institutional practice to track developmental mathematics students once they complete their developmental mathematics courses. The most important measure of the impact of a developmental course is whether its students pass the next college course in the same subject (Gerlaugh, Thompson, Boylan, & Davis, 2007; Boylan, Bonham, White, & George, 2000). It has been consistently argued by experts in the field that a seamless transition between developmental education and the college curriculum is a must (Roueche & Roueche, 1999).

An important practice implemented within the ASC environment at FSCJ was the development of modularized developmental mathematics curriculum. Reports issued by the National Center for Academic Transformation (NCAT) supported an increasing need for educational institutions to shift from the traditional paradigm that normally holds to the concept that learning must be split into standardized semester-sized chunks that are delivered by an instructor to a group of students who are physically present

when the lecture occurs. The modularized curriculum, such as what was provided in the ASC lab classrooms, offered an individualized one-on-one setting where a student could have discussion with instructors while also moving through a module at his or her own pace. Evidence in this study revealed that all of the highly successful developmental mathematics included in this study use modularized curriculum in teaching developmental mathematics. The NCAT model, which emphasized active learning, individualized assistance, ongoing assessment and prompt feedback, as well as sufficient time on task and the monitoring of student progress (NCAT, 2008), provided the basis for the developmental mathematics curriculum provided in the ASC lab setting. However, the ASC model also adhered to the research-based best practices in developmental education that included providing comprehensive support services (Boylan, 2002, pp. 26-27).

The findings in this study suggested that providing tutoring services and learning labs for developmental mathematics students, staffed by well-trained individuals, (Boylan, Bliss, & Bonham, 1997), offering flexible hours of operation to meet student needs, and locating these labs in close proximity to developmental mathematics classrooms (Boylan, 2002), were all an important part of helping students achieve greater success in developmental mathematics. According to the study participants, tutoring is necessary to meet the academic needs of their underprepared students and also helps build community, confidence, motivation, and improves students' attitudes toward learning (McCabe, 2003). All six participants in this study commented that the

attitudes and beliefs students hold about mathematics are important in fostering their ability to learn mathematics.

**Conclusion**

While the best intentions of the ASC design for delivery of developmental education at FSCJ was certainly not perfect in every respect, it signified an institutional belief by the faculty who participated in this study that the environment surrounding developmental education students is an important part of the academic process (Winn & Armstrong, 2005). Based on the academic backgrounds of their students and the resources available to them (Parmer & Cutler, 2007), educational institutions looking to improve the success rates of developmental mathematics students can benefit from examining the pedagogical practices of successful developmental mathematics teachers and the role the environmental setting plays in the success of developmental mathematics students. And while hard evidence revealed through statistics is certainly important, researchers should not discount the valuable information that can be yielded through observation. In a recent article that appeared in The Chronicle of Higher Education, "*What Data Can't Convey*," Marc Dunkelman, a research fellow at Brown University, wrote, "The absence of numerical evidence shouldn't discourage an investigation. If a question is worth answering, then the underlying issue should be considered worthy of simple and sustained observation" (Dunkelman, 2014, para. 11)

Observing those who do something well can help us see what numbers may not reveal. Observations played a key role in determining the findings of this study. Those findings suggest that developmental mathematics teachers who are trained in practices

that have shown to work well within developmental education programs, and are given the tools they need to carry out those practices, have a better chance of helping students successfully complete developmental mathematics classes. While this study focused on only one institution, and the sample size is small, the practices and the tools used by these six participants are transferrable. In other words, given the practices these participants employed, and the tools they were provided within the environment where they taught their classes, it is likely they would have been successful in any location. This study also revealed evidence supporting the powerful influence that teachers can exert on the academic success of students. In February 2013, FSCJ released a fall term analysis for developmental education courses by campus. At the Deerwood Center, where four of the participants in this study worked as a team in the ASC, the success rates in all developmental mathematics courses reached 78.4%, something never previously achieved at the institution (J. Shawver, personal communication, February 1, 2013).

With that in mind, an important use for the results uncovered by this study would be the creation and implementation of a faculty professional development program specifically targeted for those who teach developmental mathematics. Based on the findings of this study, such a program is now in the early stages of being developed. Interestingly, one of the surprises experienced while conducting this study is the apprehension that highly successful teachers have about letting others know they are highly successful. Several participants in this study were wary about having attention drawn to them because of their high success rates with developmental mathematics

students. Another surprise learned from conducting this study is that so little time and attention have been given over the years to observing the practices of highly successful developmental mathematics teachers. Prior to the implementation of the ASCs at FSCJ, and the two years spent conducting this study, not much had been done to find ways to improve the success of developmental mathematics students. In the words of former Executive Vice President Donald Green, the institution spent five years and five million dollars trying to determine what needed to be done to solve the problem, but it was the longitudinal predictive analysis study that identified highly successful developmental mathematics teachers that proved to be the turning point in how the College would come to view low success rates in developmental mathematics courses.

Over the years, a good deal of research has been conducted in the area of student learning theory. With the research that is available to those of us in education, it would seem that the things we now practice at FSCJ would have become part of the educational landscape years ago. Perhaps the biggest "ah ha" for this researcher is that many educators, like those who participated in this study, know what they need to be doing to increase success in the classroom, but the numbers of students who continue to fail developmental mathematics in community colleges, including FSCJ, indicate that not enough is being done.

Vincent Tinto, one of several practitioners whose research was used to outline the theoretical framework of this study, noted that support is a condition for student learning, and settings that provide academic and social support that is accessible to students are settings in which students are more likely to become successful learners

(2011). Furthermore, Tinto posited that students learn best in settings that hold high expectations for their learning, provide clear and consistent standards for their learning, and do so in ways that apply to all students, not just some. One of the primary focuses in the design of the ASC was to bring both the academic and the social support together in one area where trained teachers could provide students the tools they needed to succeed in developmental education courses. The results of this study reveal that six of the developmental mathematics teachers at FSCJ understand the scope of that focus.

## Appendix A

## Program Assessment and Evaluation for Redesign[1]

Below is FSCJ's approach to operationalizing the "industry standard" for program assessment and evaluation, as explicated by Boylan (2002, pp. 40–41). The proposed approach reflects an emphasis on the following measurements:

- Completion rates for developmental courses
- Grades in developmental courses
- Grades obtained in post-developmental education curriculum courses in the same subject area
- Retention rates for developmental students
- Grades in courses for which developmental students are tutored
- Student satisfaction with courses and services
- Faculty satisfaction with the skills of students who participate in developmental courses and services
- Graduation rates for developmental students.
- Working with the campus Academic Success Center faculty and staff, personnel from the Office of Instruction and Student Services as well as the Office of Student Analytics and Research will conduct data collection and analysis. Results will be disseminated college-wide to faculty and staff with a focus on continuous program improvement.

[1] From "At the Crossroads of Change: Redesigning Developmental Education for Today's Learner," by K. Ciez-Volz and P. Levine-Brown, 2010, Jacksonville, FL: Florida State College at Jacksonville Office of Instruction and Student Services, p. 37. Copyright 2010 by Florida State College at Jacksonville Office of Instruction and Student Services. Used with permission.

## Appendix B

## Program Assessment and Evaluation Plan[2]

A program assessment and evaluation plan for the Academic Success Centers (ASCs) follows:

| Outcomes and Objectives | Measure or Indicator | Assessment/Evaluation Method |
|---|---|---|
| *Establishment of Baseline Data—Planning Phase* | | |
| Student data | • Data from Florida State College at Jacksonville's student database and Connections<br>• Student success indicators<br>  ○ Course pass rate<br>  ○ Course completion rate<br>  ○ Retention rate<br>  ○ Graduation rate | • Baseline data collection including course pass rate, completion, etc. along with interviews/surveys with students currently exiting developmental courses in reading, writing, and math |
| Faculty and administrator input | • Anecdotal notes<br>• Formative report | • Interviews with project administrators<br>• Faculty surveys |
| *Student Learning Outcomes* | | |
| Students will demonstrate factual knowledge of course concepts.<br><br>Please review current course outlines for specific learning outcomes. | • Completion of course assignments; successful completion of course ("A," "B," or "C" average in coursework)<br>• Students must pass both the course and the college exit test to proceed to the next course. | • Comparison of success rates of experimental students in new Academic Success Center courses with those of students not participating in project during AY 2009-2010 |
| Increase and sustain student success in developmental courses. | • Student grades<br>• Success rates<br>• Pass rates<br>• Performance on standardized assessments | • Transcript analyses<br>• Evaluator will compare completion/retention and grade data of experimental students with data for students in traditional courses from AY 2009-2010. |
| Decrease number of attempts required for completion by developmental students. | • Compare ASC student course re-take rates with re-take rates of traditional courses. | • Evaluator will compare re-take rates of experimental students with those of students in traditional courses from AY 2009-2010. |
| Enhance student learning options/modes. | • Assess student comfort, ease, and dexterity with course format. | • Project team will conduct student and faculty surveys.<br>• Direct and indirect monitoring of |

| | | |
|---|---|---|
| | • Evaluate differential engagements of course-related technology. | course resources, including online, Web-based, and other electronic resources for frequency and duration of access, application, overall utilization, and feedback |
| Improve retention. | • Retention rate within course<br>• Program progress, educational goal attainment, academic plan development, execution, and fulfillment | • Transcript analysis<br>• Student surveys, satisfaction of quality of experience in terms of expectations met |
| *Quality of Course Redesign* | | |
| Increase of instructional materials. | • Student assessment of materials<br>• Faculty assessment of materials | • Student and faculty interviews and surveys will be used to assess the creation and delivery of effective program materials suitable for multiple deployment modes and ready to be implemented at minimal cost. |
| Program satisfaction. | • Longitudinal analyses<br>• Summative evaluation | • Follow-up interviews<br>• Participation surveys<br>• Transcript information[2] |

[2] From "At the Crossroads of Change: Redesigning Developmental Education for Today's Learner," by K. Ciez-Volz and P. Levine-Brown, 2010, Jacksonville, FL: Florida State College at Jacksonville Office of Instruction and Student Services, p. 37. Copyright 2010 by Florida State College at Jacksonville Office of Instruction and Student Services. Used with permission.

## Appendix C

## Interview Protocol

Hello. My name is Patti Levine-Brown, and I wish to extend my sincere appreciation to you for agreeing to take part in the research study I am conducting for my treatise through the University of Texas at Austin.

The title of my study is *Orchestrating Effective Practices in Developmental Math: Redesign in Developmental Education within an Academic Success Center*. I am examining the pedagogical practices of developmental mathematics teachers who have been identified through a predictive analysis study conducted by Florida State College at Jacksonville as having the highest rates of student success. I am also looking at environmental factors within the Academic Success Centers and how these factors may impact student success.

In order to gather data for my study, I will be observing and interviewing highly successful teachers like you. The one-on-one interview that I wish to conduct with you will take approximately one hour. With your permission, I would like to digitally record this interview so I can be as accurate as possible when beginning the analysis phase of my research. Will you agree to allow me to record our interview? Thank you.

Do you have any questions for me before we begin?

## Appendix D

### Interview Questions

1. What do you perceive are the characteristics of student success?
2. What do you bring to the process of teaching developmental math that helps students be successful?
3. What techniques do you use to promote student engagement, success, and retention?
4. What activities do you do on the first day of class to establish the tone for the remainder of the semester?
5. What special qualities do you bring to developmental math instruction?
6. What aspects of teaching developmental math do you find most difficult?
7. How do you address these challenges?
8. How do you use instructional technology to facilitate student's learning of developmental math?
9. What are your perceptions of the Academic Success Center?
10. What are the specific differences related to student learning between the ASC and the traditional classroom?
11. What is the impact of these differences on your teaching?

## Appendix E

## Observation Notations Used for Coding

| Observation: teaching techniques | Observation: student engagement | Observation: communication | Observation: technology | Observation: learning environment | Observation: learning relationships |
|---|---|---|---|---|---|
| Facilitates more than lectures; clearly communicates objectives for class; emphasizes mastery learning as a tool for teaching; emphasizes one-on-one and small group discussion; provides examples on the board and in discussion; gives a lot of feedback; helps students assess their progress; team teaches in a lab classroom setting | Students are not afraid to approach instructor; encourages questions; engages students in conversation; teaches math through application as well as theory; smiles frequently; calm demeanor; encourages students to meet with them outside of class | Knows students by first name; offers students cell and home phone numbers; converses with students on topics other than math; sits with student when reviewing material; eye-to-eye contact; welcomes questions from students throughout class time; provides helpful information in a variety of way (board, email, Blackboard, and phone) | Vocally supports the use of the lab environments in the teaching of math; spends additional time in lab with students; Is trained on the use of a variety of mathematical software products; provides students additional math web resources; makes use of Blackboard to provide student additional academic resources | Creates a comfortable classroom environment (greets students at the door, occasionally plays music, has a variety of text resources in the classroom); uses color in presentations and handouts; dispenses candy; computers arranged in class to allow for groups to sit and work together; encourages peer interaction and group work; temperature is set for maximum comfort | Displays mutual respect for students; inspires by expressing enthusiasm for subject matter; talks about the importance of learning beyond academics; relates learning of math as it connects to real-life situations and everyday life activities; works on developing relationships with students that foster deeper learning experiences; encourages service learning projects and community involvement that connect to math |

# Appendix F

Sample Syllabi from Developmental Math Course at FSCJ
Syllabus #1
*Note: Participants name and contact information have been removed to protect identity.*

***Florida State College at Jacksonville***
**Kent Campus or Cecil Center**
**MAT 0028 -- Elementary Algebra Syllabus**
**4 Credit Hours**

Term/Year: 20131
Instructor: XXXXXXXX
E-mail: elangham@fscj.edu
Reference Number: 371743
Day/Time: MW 2:00 – 3:50pm
Room: Lecture 122A/ Lab 118D
Office Location: A224
Office Hours: MW 10-11:45 & 4-5pm; TR noon - 2pm
Contact Information: XXXXXXX Office/ XXXXXXX Text Line

**IMPORTANT COLLEGE DATES**

| | |
|---|---|
| Course Start Date: | Monday, August 27, 2012 |
| Drop with 100% refund | Tuesday, September 4, 2012 |
| Withdraw with "W" grade | Thursday, November 1, 2012 |
| Course End Date: | Friday, December 14, 2012 |

**CATALOG COURSE DESCRIPTION**

This course is designed for students who have had little or no algebra. The major topics in this course are sets, real numbers and their properties, exponents and polynomials, linear equations and linear inequalities, as well as an introduction to factoring, rational expressions, radicals (square roots), and graphing in two variables. Four contact hours.

**REQUIRED TEXTS AND INSTRUCTIONAL MATERIALS**

Meisel, B., & Shawver, J. E. (2011). *Elementary algebra* (6th ed.). Jacksonville, FL: Florida State College at Jacksonville, ISBN: 978-1-931997-64-5

**Headphones:** Only for Lab-Assisted classes
**Calculator:** TI 30XIIs
**E-book:** www.Cafescribe.com

**LEARNING OUTCOMES**

When you finish this course, you will be able to:

- Solve problems using sets of real numbers
- Solve problems using real numbers and their properties
- Solve problems using exponents and polynomials
- Solve linear equations with one variable
- Solve linear inequalities with one variable
- Factor polynomials
- Solve and simplify rational expressions
- Simplify square roots
- Graph linear equations with two variables

**LEARNING MANAGEMENT SYSTEM (COURSE PLATFORM)**

This course is delivered in the online learning management system supported by your institution and the management system is used for posting important documents, discussions, and grades. The lessons and interactive math assignments are available in the MathXL online system.

**TECHNOLOGY REQUIREMENTS**

Please use the following checklist to determine your computer readiness. You should own or have access to:

- Computer with personal access to the Internet (e.g., computer with a modem or cable modem connection)
- An e-mail account
- Web-browser software--at least Internet Explorer 5.0, Firefox 2.0, Safari 3.1, or above
- Windows XP or higher operating system (or MAC OS X or higher)
- Virus-checking software
- Word-processing software
- Plug-ins, including Acrobat Reader, Flash Player, and QuickTime
- Additional hardware, including speakers and microphone

The CD-ROM published content will run on any computer that has:

- Windows 98, 2000, ME, NT, or XP-based PC with Intel® or AMD® class processor
- 32 MB RAM
- a CD-ROM drive

**AOL Users:** You cannot view MathXL using the AOL browser. You can, however, use AOL as your Internet Service Provider to access the Internet and then open Internet Explorer to access MathXL.

**Browser Settings:** "Pop-ups" must be permitted for MathXL. See your browser's Help menu for instructions on how to view or change these browser options.

**ACCESSIBILITY**

If you require specific accommodations to complete this course, contact your institution's coordinator for disability services (Robin Woolbright 904-381-3500); you may also wish to notify your instructor.

**LAB-ASSISTED COURSES**

You are in a lab-assisted course. Please note the following:

1. **Attendance**: You will spend at least 3.5 – 4 hours a week in a computer classroom or lab using the MathXL software located online at http://www.mathxl.com. There will be 1 – 2 hours of lecture; your instructor (and possibly a Master Student or tutor) will be in the lab to help you learn how to use the computer and the software and to assist you in learning the math materials and passing the course. The instructor will provide the open lab hours for this class. By working in the lab for 1.5 – 4 hours a week, you may earn up to 2% toward your final grade. MathXL records the amount of time spent working problems and navigating through the course. Since this is a self-paced class, you are encouraged to work at whatever pace is necessary to complete at least one chapter a week in MathXL. **You must complete your exams by the deadline listed below (in the table on page 6)**. Your instructor may notify you when it appears that you will be unable to complete the class on time. (Note: If you finish the course early, you will still earn the total 2% for attendance for the remaining weeks, even though you will not be working in MathXL). Any student that does not complete four hours of work during a continuous three-week period may be given a Failure for Nonattendance (FN grade) for the class. The FN grade can impact scholarships and financial aid.
2. **MathXL and Textbook**: When using MathXL, you will notice that the assignments in MathXL are exactly aligned with the chapters in the textbook. Reviewing the problems in the textbook, along with the videos and assignments in MathXL, should assist you in learning the material in a more in-depth and efficient manner.
3. **Quizzes:** Once you finish an assignment in MathXL with an 80% or above, you will need to take a quiz. The quizzes will appear under your assignment, under the Homework and Tests button. You have four attempts at each quiz, and only your best score will count. You must attempt the quiz at least once in order to start your next assignment in MathXL. If you complete your course work prior to December 8th, a fifth attempt will be added. Portfolio grades come from your submission of your scratch work from the first attempt at each quiz in this course. The deadline for submitting your scratch work is the same as the second attempt deadline for the tests. (Quiz 1-4 are covered on Test 1 therefore, the scratch work for quiz 1-4 is due by Sept. 29th.)
4. **Exams:** Once you have completed assignments and quizzes one through four in MathXL, along with the exam review 1 with a score of 70% or above, then you are ready to attempt exam 1. In order to attempt exam 2 you must complete assignments and quizzes five through seven in MathXL, along with the exam review 2 with a score of 70% or above. In order to attempt exam 3 you must complete assignments and quizzes eight through ten in MathXL, along with the exam review 3 with a score of 70% or above. In order to attempt exam 4 you must complete assignments and quizzes eleven through fourteen in MathXL, along with the exam review 4 with a score of 70% or above as well as MathXL post - exam. In order to adequately prepare for this exam, we recommend that you take the exam review located in MathXL as many times as you like. Once you feel ready, notify your instructor. You only get two attempts on each Exam, so study well before taking it the first time. After your first attempt, your instructor may give you feedback on the areas you need to study before your second attempt at an exam. **YOU MUST HAVE A SCORE OF 100% ON THE SECOND**

**EXAM REVIEW IN ORDER TO TAKE THE TEST A SECOND TIME.** Only the highest score of the two attempts per test will count towards your grade. All tests are to be taken in the assessment center or the ASC testing room. You may use your TI30XIIs calculator however, notes are not allowed.

5. **Testing Procedures:** Once you have completed the required material for taking the test, notify your instructor. Please note the deadlines for taking tests are in the syllabus and in MathXL. If for any reason you do not take a test by the attempt deadline indicated, you will receive a score of zero. If you miss the original due date for a test, you must complete the first and second attempt review before you can take the missed test. You will only have one attempt at that point.

| ASSESSMENT | WHEN | First Attempt Deadline | Second Attempt Deadline |
|---|---|---|---|
| Test 1 | After completing Exam Review 1 | September 22, 2012 | September 29, 2012 |
| Test 2 | After completing Exam Review 2 | October 13, 2011 | Friday October 19, 2012 |
| Test 3 | After completing Exam Review 3 | November 3, 2012 | November 10, 2011 |
| Test 4 | After Completing Exam Review 4 | December 1, 2012 | December 8, 2012 |
| Final Exam | After completing Test 4 | December 14, 2012 | |

**LEARNING COMMUNITIES**

Students learn through interactions with each other, with the instructor, and with written, auditory, and visual learning materials. To facilitate interactive learning among learners and between learners and faculty, a major goal of this course is to encourage the development of learning communities—i.e., to help learners and faculty get to know and better understand each other. Towards this end, the instructor will introduce herself/himself during the first week of class. You may be asked to introduce yourself to the class during the first week of class. You may be placed in groups of seven during the classroom lecture to encourage the development of learning communities.

**ASSESSMENTS AND ASSIGNMENTS**

Your course grade is based on online assignments and quizzes, attendance, and proctored tests. Videos and Explanations are provided in each assignment in MathXL, and tutors may be available.

**Attendance:** You will need to work in MathXL for 3.5 – 4 hours a week in order to earn an attendance grade. If you finish the course early, you will still earn the total 2% for attendance for the remaining weeks, even though you will not be working in MathXL. If you miss more than 3 classes, you may be dropped from the course due to non-attendance and receive a letter grade of F or FN at the discretion of the instructor.

**Assignments in MathXL:** MathXL scores your problems as you complete them. Your instructor will work with you each week to determine your progress and to provide help as needed. Under the Homework and Tests button in MathXL, you will find an assignment and a quiz for each chapter. You must score 80% or above on each assignment prior to taking a quiz. Assignments will be graded per chapter. Each assignment is worth 1%, for a total of 14% toward your final grade average.

**Quizzes:** There are fourteen quizzes in the course, one for each chapter. You must complete each quiz prior to moving to the next chapter. You may retake the quiz. (Limited to 4 attempts) Only your best grade counts towards your average. Each quiz is worth 1%, for a total of 14% toward your final grade average.
**Tests:** There are four proctored tests in this course. You may attempt each test twice before final tests begin. Only the highest score of the two attempts per test will count toward your final grade. Each test is worth 17.5%, for a total of 70% toward your final grade average.

**GRADING**

Your final letter grade will be determined by totaling the points for all of the above activities, as indicated in the chart below.

| | |
|---|---|
| Assignments in MathXL | 15% |
| Quizzes | 15% |
| Tests | 45% |
| Attendance & Portfolio* | 5% |
| Final Exam | 20% |
| **Total** | **100%** |

| | |
|---|---|
| A | 100 – 90% |
| B | 89 – 80% |
| C | 79 – 70% |
| D | 69 – 60% |
| F | Below 60% |

**FREQUENTLY ASKED QUESTIONS FOR FLORIDA STATE COLLEGE AT JACKSONVILLE STUDENTS**

***1. What learning management system is used at FSCJ for the online portions of this course?***

This course is delivered in the MathXL online course platform. Some instructors will also use the Blackboard® online course platform in conjunction with MathXL.

***2. Where do I acquire the required texts and instructional materials for this course?***

All SIRIUS course materials (book, software, and any other materials you may need) can be purchased at your campus bookstore. There is a free e-book that you can access online from www.Cafescribe.com

***3. Do I have to have Internet access at home?***

It is recommended that you have Internet access at home; however, the College does have many student computer labs available to students who wish to use them.

***4. What if I need special accommodations to take the course?***
If you require specific accommodations to complete this course, contact Services for Students with Disabilities at http://floridastatecollegecatalog.fscj.edu/content.php?catoid=11&navoid=683#special and notify your instructor.

***5. How long will I have to wait for a response from the instructor to my e-mail?***
Faculty responds to e-mails within 48 hours. This will exclude weekends.

***6. What is proper e-mail etiquette?***
E-mail to other learners and the instructor needs to be addressed in a manner appropriate to polite interactions.

***7. What will help me succeed in this course?***
- Strong discipline and desire to succeed. You'll need to log in to class often during the typical week, motivating yourself to meet the requirements for success.
- Ability to work well independently. You'll develop the support of fellow learners all taking the same coursework together, but it will be different than a typical classroom environment. If you work well independently, your chance of success is higher.
- Computer savvy. If you're not familiar with the Internet and e-mail communication, we recommend that you take a computer enrichment class prior to enrolling in this course. Faculty assumes you know how to access and send data on the Internet.

***8. What are "I" grades, and when are they used?***
An "I" grade may be assigned at the instructor's discretion upon request by the student to permit the student time to complete required course work, which s/he was prevented from completing in a timely way due to non-academic reasons. The instructor may require the student to document the request to assist in the decision. The instructor may choose not to grant the request. The "I"

grade should be considered only when the student has the potential to earn a passing grade if the missing work is made up.

The instructor shall prescribe in a written agreement with the student the remaining coursework required for completion and removal of the "I" grade. A copy of this agreement will be kept on file in the office of the appropriate dean. All work must be completed within the first eight weeks of the subsequent term, unless the instructor agrees to a longer timeframe (not to exceed one year). When the work is completed, the instructor will submit a grade change form with the grade earned. If the work is not completed within the prescribed timeframe, the "I" will automatically change to an "F" grade. The student will be informed of the final grade assigned.

Note: To be eligible for an "I" grade, the student must be passing the course at the time of the request, and must have completed at least 75 percent of the course work.

***9. What is the Florida State College at Jacksonville Code of Ethics?***
Consistent with The Code of Ethics of the Education Profession in Florida, 6B-1.06, Principles of Professional conduct for the Education Profession in Florida, an obligation to the learner requires that an individual shall not harass or discriminate against any learner on the basis of race, color, religion, sex, age, national or ethnic origin, political beliefs, marital status, handicapping condition, sexual orientation, or social and family background and shall make reasonable effort to assure that each learner is protected from harassment or discrimination.

***10. What about academic dishonesty?***
Academic dishonesty, in any form, is expressly prohibited by the rules of the District Board of Trustees of Florida State College at Jacksonville. Academic dishonesty incorporates the following:

- Cheating which is defined as the giving or taking of any information or material with the intent of wrongfully aiding oneself or another in academic work considered in the determination of a course grade.
- Plagiarism which is defined as the act of stealing or passing off as one's own work the words, ideas, or conclusions of another as if the work submitted were the product of one's own thinking rather than an idea or product derived from another source.
- Any other form of inappropriate behavior which may include but is not limited to falsifying records or data; lying; unauthorized copying, tampering, abusing or otherwise unethically using a computer or other stored information; and, any other act of misconduct which may reasonably be deemed to be a part of this heading.
- Any student alleged to have committed any act of academic dishonesty as defined herein shall be entitled to due process as defined in District Board of Trustees' Rule 6Hx7-2. 18 prior to the administration of disciplinary action**,** including suspension and dismissal.

***11. May I repeat this course?***
Learners repeat a course in an attempt to improve a grade previously earned. State Board Rule 6A-14.0301 limits such attempts to courses where a "D," "F," or "FN" grade was earned. A learner has only three total attempts in any course, including the original grade, repeat grades, and withdrawals. Upon the third attempt in a course, the learner must be given an "A," "B," "C," "D," or "F."

When students repeat a course at Florida State College at Jacksonville, only the last grade earned is calculated in their cumulative grade point average (GPA). However, students with an excessive number of "W" or "FN" grades and students who repeat courses to improve their GPA may jeopardize their admission to programs in the Florida State University System (SUS) or other institutions.

Syllabus #2

**Welcome!**

Welcome and thank you for enrolling in this course! I think you will enjoy our time together!

For some, this may be your first computer-based course. If you are not a computer whiz, don't worry. You don't need to be. From a computer standpoint, everything is simple to use and easy to navigate.

Please take a few minutes to read the syllabus in its entirety. Exploring all the topics in this syllabus and related links will help you succeed in this course.

I am looking forward to working with you and having a great semester!

**Professor XXXXXXXX**

**Professor Information**

Professor: XXXXXXXXXXX
Open Lab Hours: Mon: 3 – 4pm; Tues: 10am – 2:30pm; Wed: 3 – 4pm; Thur: 8 – 11am
Office Location: XXXXX
Office Hours: Mon: 7:30am- 8:00am; 10:00am – 12:30pm (8/27- 9/20 only); Tues.: 7:30 – 8:00am; Wed.: 7:30am- 8:00am; 10:00am – 12:30pm (8/27- 9/20 only); Thurs.: 7:30– 8am
Office Phone: XXXXXXXXXX
Email: XXXXXXXXXXXX

**Instructor Response**

You can anticipate responses to emails within 24-48 hours of receipt.

**Campus Information**

This course is offered by the Florida State College at Jacksonville Deerwood Center. For questions or concerns, please feel free to call (904)-997-2500. For technical assistance, please contact the Online Support Center (904-632-3151).

**Course Description**

This course is designed to help students develop the basic skills necessary for success in Intermediate Algebra. The course involves a variety of teaching and learning methods, including lab-enhanced learning, lecture, discussion, cooperative learning, and others. The major topics in the course are real numbers and their properties, exponents and polynomials, linear equations and linear inequalities, as well as an introduction to applications, factoring, rational expressions, radicals (square roots), and graphing in two variables. This course does not apply toward the associate's degree.

**Course Prerequisite**

MAT 0018 with a grade of "C" or better, or satisfactory score on the placement test.

**Course Information**

Course Number/Title: MAT 0028 Elementary Algebra
Reference Number: 371320
Classroom: B2204
Class Meeting Times: 8am – 9:40am
Number of Credit Hours: 4
Term/Year/Session/Length: Fall 2012- 16 weeks

**Learning Outcomes**

Upon completion of the course, the student will be able to:

- Apply the basics of elementary algebra and gain confidence in her/his ability to learn and use the principles of elementary algebra appropriately
- Understand and perform mathematical operations with sets of real numbers relating to notations, subsets, and operations in sets
- Understand and perform mathematical operations with real numbers relating to the number line, properties, operations, order of operations, and applications
- Understand and perform mathematical operations with exponents and polynomials
- Understand and perform mathematical operations with linear equations and linear inequalities in one variable
- Understand and perform fundamental operations with basic introductory polynomial factoring to include solving quadratic equations using factoring
- Understand and perform mathematical operations related to rational expressions to include simplification, multiplication, division, addition and subtraction of like and unlike denominators, and solving proportions
- Apply the concept of introductory square roots and linear equations in two variables using plot points and graphing linear equations

Important Dates

| | |
|---|---|
| **Class Begins** | Monday August 27th |
| **100% Refund Deadline** | Tuesday September 4th |
| **Withdraw with "W" Deadline** | Thursday November 1st |
| **College Holidays** | Monday September 3rd- Labor Day<br>Monday November 12th- Veterans Day<br>Thursday November 22nd – Sunday November 25th - Thanksgiving |
| **Class Ends** | Wednesday December 12th |

These dates are critical for this course. Additional critical dates for this course can be found by clicking the appropriate term links in the online calendar at the Florida State College at Jacksonville Website.

Instructional Materials and Equipment

SIRIUS Academics course materials include an e-book with a MathXL access code, both of which can be found in your Connections account. To access the CafeScribe e-book reader and your digital textbook, login to Connections and locate the link listed under the course description in your fall 2012 class schedule. You will NOT have to login to the CafeScribe reader or use an access code. Once you click the link, your e-reader will open with your bookshelf and e-book(s) available to you. Anytime you wish to read your digital textbook from

an Internet-connected computer, use the CafeScribe icon link in Connections to access your account.
An optional printed book can be purchased for an additional $24.95 from the Deerwood bookstore.

**Required Text/Materials**

Meisel, B., & Shawver, J. (2011). *Elementary algebra* (6th ed.). Jacksonville, FL: Florida State College at Jacksonville, SIRIUS Academics. ISBN: 978-1-931997-78-2 (digital version-already paid for- see the section above "Instructional Materials and Equipment); 978-1-931997-64-5 (printed copy-will cost an additional $25 from the bookstore)

MathXL online software (already paid for): Log into your Connections account and view your current course schedule. Embedded within the schedule you will find the "My Labs Access Code", which is the access code needed for you to create an account at www.mathxl.com

Headphones, which are used for watching the videos for the course
Three ring binder, ½ inch to 1 inch
Calculator (optional): Casio SL-300VC, Casio SL-300VC, TI-30X, TI-108 Basic Solar Calculator, Casio fx-260
Online Delivery System

This course will be delivered using the Blackboard Learn™ course management system and MathXL. The Blackboard learning management system is used for posting important documents and discussions. The MathXL online system is used to complete lessons and interactive math assignments.

**Technology Requirements**

Reliable and consistent computer and Internet access is encouraged to successfully participate in and complete this course. Ensure that your computer meets the minimum system requirements noted below. Please use the following checklist to determine your computer readiness.

You should own or have access to:

- An email account
- Computer with high speed access to the Internet
- Access to College computers when needed
- Virus-checking software
- Word-processing software
- Software and plug-Ins that may include (click the titles for the free downloads)
  - Adobe Acrobat Reader
  - Flash Player
  - Java
  - QuickTime
  - RealPlayer
  - Shockwave Player
  - Windows Media Player

It is a good idea to check your computer at the beginning of each class and a couple of times throughout the term to ensure you have all the necessary software and plug-ins to use the Blackboard online system and course features. After logging in to Blackboard, click on the Browser Checker link. Review the results and click the links to the recommended software.

Please note that you will need to turn off your pop-up blocker to use all features of this online course, especially in MathXL.

**Blackboard™ Supported Browsers for Blackboard Version 9.0.539.0 SP3**

To view Blackboard's most recent browser compatibility page, click here. Please note the following when reviewing the Blackboard compatibility ratings.

**Certified:** 100% Compatible

Compatible**:** Compatible in most areas, but could have some incompatibility issues

**Unsupported:** Not tested and not recommended

**MathXL Support**

If you experience any type of problem with the MathXL site, please contact the MathXL Customer Support Center directly before contacting your instructor or the College help desk.

Online tutorials, user guides, and a searchable support database are available at the MathXL Support site (http://www.mathxl.com/support/contactus_stu.htm). If you cannot find an answer to your question or problem within these pages, contact MathXL Customer Support by phone at 800.677.6337 (toll free, Mon – Fri, 8am – 8pm EST).

**MathXL Login Procedures**

To create an account in MathXL, go to http://www.mathxl.com; click *First Time User* (Register with Access Code). Use the My Labs access code that is embedded in your course schedule in Connections along with the Course ID, which will be given to you by your instructor.

Once you have registered, click the *Browser Check* to make sure your computer contains all the needed plug-ins to view the problems. Finally, click *How to Enter Answers* and go through the tutorial so that you can begin your work in MathXL.

If you already have an account with MathXL, login to your account and click on "Enroll in New Course." You will then be prompted to enter the new Course ID of the class you are now taking.

**Please note that if you don't use your My Labs Access code during the registration process, your account will eventually "expire" about two months into the semester (access codes are only good for 6 months). If your account expires during the semester, follow the given steps below:

1. Log into MathXL and click on Register as a student.
2. Mark "Yes" as to whether you have an access code.
3. Click "I accept" on the next screen.
4. On the following screen click "Yes" for if you have a Pearson account, and then enter your current login info and finally the My Labs access code at the bottom.

You should be fine for six months after you update it.

Accessibility

If you require specific accommodations to complete this course, contact Nicole Dyer (646-2191) or the Florida State College at Jacksonville Office of Services for Students with Disabilities. Click here for contact information.

## Your Course Participation and Assessments

**Attendance**

For 16-week classes, you will need to work in MathXL for 3.5 hours a week in order to earn three points each week (for the first 15 weeks of class) for a total of 45 points or 4.5% of your grade. If you miss a class, show up tardy, or leave early, you will be required to make up the time in the open lab, B2205.

***NOTE:*** *Students who complete the course in less than the allotted time will receive attendance points for all future weeks in the course.*

There are limited due dates associated with any specific topic or quiz in this class, except that **you should complete**

- **Test 1 by the end of week 4**
- **Test 2 by the end of week 7**
- **Test 3 by the end of week 10**
- **All your MathXL work, including the Final Exam, by December 13th at Noon.**

Your instructor will notify you when it appears that you will be unable to complete the class on time.

Any student who misses three class sessions (or the equivalent of 6 hours of instruction) and doesn't make them up, or any student that does not complete at least five hours of work in MathXL during a continuous three-week period, may be given a Failure for Nonattendance (FN grade) for the class. The FN grade can impact scholarships and financial aid.

**Assignments in MathXL**

There are homework assignments covering the material for each chapter, and practice exam homework assignments for each test. These assignments will be completed in MathXL. As you complete the homework, MathXL provides several types of assistance to help you solve the problems. Remember that when you are doing the homework, you are learning and preparing for other assessments. **You must score an 80% or above before moving on to the quiz for that particular chapter.**

Now to begin your work in MathXL, click the Homework and Tests button. Then click *Assignment 1,* which correlates with textbook Chapter 1. Once your assignment opens, click the

first problem. If you know how to solve it, then do so. If not, read through the examples in the textbook or watch the video in MathXL (not all problems have videos linked to them). If you need more than the explanation provided, click *View an Example* or *Help Me Solve This* (both of these options are available on most problems in the homework). Once you have answered a question, click *Check Answer.* If it is incorrect, click *Help Me Solve This.* MathXL will walk you through how to solve the problem. After MathXL explains an answer, it will give you another problem to try. Click *Similar Exercise* and keep working the problem until you get it correct.

If you are working from home and don't get a problem correct, or you feel you need more explanation on a problem, click the *Ask My Instructor* button and type your question. MathXL will send to your instructor an email with the problem attached.

Finally, when you finish an assignment, click *Save.*

Each assignment is worth up to 5 points, for a total of 90 points (9% of your grade).

**Portfolio**

A portfolio is a binder that contains all your notes, worked out problems, and additional Chapter Study Guides for every chapter of this course. After you complete an assignment for a given chapter in MathXL, you should then complete the Chapter Study Guide for that particular chapter. Your professor will check your Chapter Study Guides, and give you any feedback prior to you taking a quiz. Once you have completed all of the required material for an exam, you will need to submit your entire portfolio to your instructor for review (see the Portfolio Cover sheet in Blackboard for guidance). The portfolio is worth 30 points, or 3% of your grade.

**Quizzes**

Once you finish an assignment in MathXL with an 80% or above, you will need to take a quiz. The quizzes will appear after the assignment under the "Homework and Tests" button. You get unlimited number of attempts, and only your best score will count. **However, you must get a score of 70% or above on a Quiz to start your next assignment (or chapter) in MathXL.**

Each quiz is worth up to 10 points each, for a total of 140 points (or 14% of your grade).

**Tests**

In addition to the homework and quizzes, there are **four proctored tests, one of which is a cumulative final,** given during the course. The first test will cover the material from the first five chapters. The second test will cover chapters 6 – 8, and the third test will cover chapters 9 - 11. The final exam is cumulative and will cover all chapters in the course.

In order to adequately prepare for these tests, we recommend that you take the practice tests located in MathXL as many times as you like. (Note: After your first attempt on the practice test, a homework exercise will generate based on the problems you missed. Complete this assignment before taking the test a second time.) Once you feel ready, let your instructor know and s/he will determine if you are ready to test. All tests are proctored and you only get two attempts on the tests and one attempt on the final, so study well before taking them the first time. After your first attempt, your instructor will give you feedback on the areas you need to study before you take it again. Only your best score will count if you take a test twice.

The tests are worth up to165 points each, and the cumulative final is worth up to 200 points, for a total of 695 points (or 69.5% of your grade).

**Make-up policy for Tests**

Note the deadlines for taking tests in the minimum pacing chart. If for any reason you do not take a test within one week by the date noted, you will need to provide documentation to your instructor regarding your reason for missing this deadline. The instructor must decide whether or not you will be allowed to make up the test.

Course Grade

The attendance, assignments, portfolio, quizzes, and tests will be used to compute the final grade in the course. Your final letter grade will be determined by calculating the overall percentage earned on all graded coursework using the following weighted scale.

| ASSIGNMENTS | POINTS |
|---|---|
| Weekly Attendance (15 weeks @ 3 points each week) | 45 (4.5%) |
| Assignments in MathXL (18 @ 5 points each) | 90 (9%) |
| Portfolio | 30 (3%) |
| Quizzes in MathXL (14 @ 10 points each) | 140 (14%) |
| Tests (3 @ 165 points each) | 495 (49.5%) |
| Final Exam | 200 (20%) |
| **Total Points** | **1000 (100%)** |

***Note: MathXL shows your current weighted average at all times, but not an accurate running point total.***

| GRADE | POINTS |
|---|---|
| A | 900-1000 |
| B | 800-899 |
| C | 700-799 |
| D | 600-699 |
| F | 0-599 |

**FN Grade – Failure for Non-Attendance**

Students who miss three or more classes (and don't make them up), or who stop attending or participating (regularly or consistently) in class **and** are failing, **must** be given an FN with the last date of attendance recorded on the grade form. The FN grade indicates that a student has failed a course due to non-attendance. It is calculated as an "F" in the student's grade point average. For students receiving financial aid, failure for non-attendance may require the student to refund to the college all or part of his/her aid. Please refer to the College catalog for additional information.

**I Grade - Incomplete**

An "I" grade may be assigned at the instructor's discretion upon request by the student to permit the student time to complete required course work, which s/he was prevented from completing in a timely way due to non-academic reasons. The instructor may require the student to document the request to assist in the decision. The instructor may choose not to grant the request. The "I" grade should be considered only when the student has the potential to earn a passing grade if the missing work is made up.

The instructor shall prescribe in a written agreement with the student the remaining coursework required for completion and removal of the "I" grade. A copy of this agreement will be kept on file in the office of the appropriate dean. All work must be completed within the timeframe given by the instructor. When the work is completed, the instructor will submit a grade change form with the grade earned. If the work is not completed within the prescribed timeframe, the "I" will automatically change to an "F" grade. The student will be informed of the final grade assigned.

To be eligible for an "I" grade, the student must be passing the course at the time of the request, and must have completed at least 75 percent of the course work.

**NA Grade – Drop for Nonattendance**

This is a mandatory process performed by all instructors to stop unnecessary financial aid debt. Students who do not attend class at least one of the first two class meetings will be dropped by their instructor for non-attendance. The drop process refunds money to the payment source, i.e. student, financial aid, veterans, third party. Instructors will formally submit an NA grade report.

**Repeating the Course**

Students may repeat a course in an attempt to improve a grade previously earned. State Board Rule 6A-14.0301 limits such attempts to courses where a "D", "F" or "FN" grade was earned, and limits to two the number of times a course grade may be forgiven. The official grade and the grade used for calculating the GPA shall be the last grade earned in the course. In other words, a student may not repeat a course for which they have received a "C" or better.

A student may have only three total attempts in any course, including the original grade, repeat grades and withdrawals. Upon the third attempt in a course, the student must be given an "A", "B","C", "D", or "F". A fourth attempt may be allowed only through a general appeals process based on extenuating circumstances. ON the 3rd attempt, out-of-state- tuition is charged which is about four times the in-state tuition.

Note: If you have an excessive number of "W" or "FN" grades and repeat courses to improve your GPA, you may jeopardize your admission to programs in the Florida State University System (SUS) or other institutions.

**Institutional Effectiveness Initiative**

Student work in this class may be collected by the College for the purposes of assessing institutional effectiveness and measuring general education competencies. The artifacts collected and submitted for this purpose will be done so anonymously.

**Pacing Guides**

Follow one of the pacing schedules below. The first one is a minimum pacing schedule, and the second is an early completion, accelerated pacing schedule if you want to finish before Thanksgiving. **If you can't maintain the minimum pacing schedule, you will probably not complete this course on time.** You are encouraged to stay on pace or ahead of the minimum pace by attending the ASC lab and working from home on a regular basis.

**Special Note**: The instructor reserves the right to modify this syllabus. You will be notified of any changes.

Enjoy your Thanksgiving Pacing Guide for a 16 week Class

| Week | Topic(s) and Reading | Assignments and Activities | Due Dates |
|---|---|---|---|
| **Week 1** | **Evaluating Algebraic Expressions; Simplifying Variable Expressions** | Complete Assignments 1 & 2, and Quizzes 1 & 2 in MathXL | 8/31 at 1pm |
| **Week 2** | **Solving Linear Equations, including Applications.** | Complete Assignments 3 & 4 and Quizzes 3 & 4 in MathXL. | 9/7 |
| **Week 3** | **Solving Linear Inequalities** | Complete Assignment 5 and Quiz 5 in MathXL.Take Practice Test 1 in MathXL and complete the Practice Test 1 homework | 9/14 |
| **Week 4** | **Test 1; Beginning of Graphing Lines** | Take Test 1(covers chapters 1 – 5)Complete Assignment 6 and Quiz 6 in MathXL | 9/21 |
| **Week 5** | **Graphing Lines and Slope** | Complete Assignment 7 and Quiz 7 in MathXL. | 9/28 |
| **Week 6** | **Exponent Laws and Scientific Notation** | Complete Assignment 8 and Quiz 8 in MathXL.Take Practice Test 2 in MathXL and complete the Practice Test 2 homework | 10/5 |
| **Week 7** | **Test 2; Operations on Polynomials** | Test 2 (covers chapters 6 – 8) Complete Assignment 9 and Quiz 9 in MathXL. | 10/12 |
| **Week 8** | **Factoring Polynomials** | Complete Assignment 10 and Quiz 10 in MathXL. | 10/19 |
| **Week 9** | **Solving Quadratic Equations** | Complete Assignment 11 Quiz 11in MathXL. Take Practice Test 3 and complete the Practice Test 3 homework. | 10/26 |

| | | | |
|---|---|---|---|
| **Week 10** | **Test 3; Adding, Subtracting, Multiplying, and Dividing Rational Expressions** | Test 3 (covers chapters 9 – 11)<br>Complete Assignment 12 and Quiz 12 in MathXL. | 11/2 |
| **Week 11** | **Solving Proportions; Adding, Subtracting, Multiplying, and Dividing Radicals; Pythagorean Theorem** | Complete Assignments 13 & 14 and Quizzes 13 & 14 in MathXL. | 11/9 |
| **Week 12** | **Studying for the Final** | Complete the Practice Final and the practice final homework in MathXL.Take the Final Exam | 11/16 |
| **Week 13** | **Final Exam** | Take the final exam (covers all chapters)Enjoy your Thanksgiving and don't think about math ☺ | 11/21 |

| **Week** | **Topic(s) and Reading** | **Assignments and Activities** | **Due Dates** |
|---|---|---|---|
| **Week 1** | **Evaluating Algebraic Expressions; Simplifying Variable Expressions** | Complete Assignments 1 & 2, and Quizzes 1 & 2 in MathXL. | 8/31 at 1pm |
| **Week 2** | **Solving Linear Equations, including Applications.** | Complete Assignments 3 & 4 and Quizzes 3 & 4 in MathXL. | 9/7 |
| **Week 3** | **Solving Linear Inequalities** | Complete Assignment 5 and Quiz 5 in MathXL.<br>Take Practice Test 1 in MathXL | 9/14 |
| **Week 4** | **Test 1** | Complete the practice test 1 homework in MathXL<br>Take Test 1 (covers chapters 1 – 5) | 9/21 |
| **Week 5** | **Graphing Lines and Slope** | Complete Assignments 6 & 7, and Quizzes 6 & 7 in MathXL. | 9/28 |
| **Week 6** | **Exponent Laws and Scientific Notation** | Complete Assignment 8 and Quiz 8 in MathXL.<br>Complete Practice Test 2 in MathXL | 10/5 |
| **Week 7** | **Test 2** | Complete the Practice Test 2 homework in MathXL<br>Take Test 2 (covers chapters 6 - 8) | 10/12 |
| **Week 8** | **Operations on Polynomials** | Complete Assignment 9 and Quiz 9 in MathXL | 10/19 |

| | | | |
|---|---|---|---|
| **Week 9** | **Factoring Polynomials and Solving Quadratic Equations by Factoring** | Complete Assignments 10 & 11, as well as Quizzes 10 & 11, in MathXL. | 10/26 |
| **Week 10** | **Test 3** | Complete Practice Test 3 and the Practice Test 3 homework in MathXL.<br>Take Test 3 (covers chapters 9 – 11) | 11/2 |
| **Week 11** | **Simplifying, Multiplying, and Dividing Rational Expressions;** | Complete Assignment 12 and Quiz12 in MathXL. | 11/9 |
| **Week 12** | **Adding or Subtracting Rational Expressions; Solving Proportions** | Complete Assignment 13 and Quiz 13 in MathXL. | 11/16 |
| **Week 13** | **Adding, Subtracting, Multiplying, and Dividing Radicals; Pythagorean Theorem** | Complete Assignment 14 and Quiz 14 in MathXL. | 11/21 |
| **Week 14** | **Final Exam studying** | Complete the Practice Final Exam and the practice final exam homework.<br>Take the practice final exam again, without your notes, to see if you are ready to take the test.<br>Please complete the course evaluation. | 11/30 |
| **Week 15** | **Final Exam** | Take the Final Exam (covers all chapters) | 12/7 |
| **Week 16** | **Remediation and Make-ups** | Faculty will continue to work with students that need assistance completing the course.<br>Grades posted | 12/13 at Noon. |

*16 Week Course Minimum Pacing Guide*

## Course Guidelines/Policies

Academic Dishonesty Policy

Academic dishonesty, in any form, has severe consequences. Click here to view FSCJ's academic dishonesty definitions and procedures.

Attendance Policy

Attendance is measured in this course by your weekly access to the online content and timely attendance to class. If you fail to attend class and/or sufficiently participate in the course prior to the official refund deadline, you can be dropped for non-attendance. If the official withdrawal date has passed and you fail to sufficiently progress in the course, you can be awarded a Failure for Non-Attendance (FN) grade (see page 8).

Late/Make Up Work Policy

There are limited due dates associated with any specific topic or quiz in this class, except that **you should complete**

- **Test 1 by the end of week 4**
- **Test 2 by the end of week 7**
- **Test 3 by the end of week 10**
- **All your MathXL work, including the Final Exam, by December 13th at Noon.**

If you miss the deadline by a week for one of the tests or the final, you must provide documentation to your professor for an approved extension. If no documentation is given, and/or if the professor deems your reason unacceptable, then you will receive a zero on the test and any remaining assignments.

**Expectations of Student Conduct**

It is expected that each of you use appropriate, professional language and respect when addressing classmates, as well as your instructor, in the classroom. That same level of professional conduct should extend to all assignments submitted.

Recommendations for Success in this Course

- Have a place where you can study and set aside an appropriate amount of time to do it. Generally, a 3-credit hour course requires a minimum of 12 hours of self-study time each week in addition to the time spent completing assignments.
- Practice and repetition are the best way to ensure your mastery of the material.
- Communicate with your instructor to ask any important questions and to discuss important concepts.
- Complete all reading assignments and view and review all chapter resources.
- Complete and review all online classroom activities.
- Stay ahead of the minimum pace.

**College Resources**

Florida State College at Jacksonville offers many resources to help you become successful in your course and academic career. A brief description of some of these resources follows.

Library and Learning Commons

The Library/Learning Commons (LLC) is an instructional area of the College designed to offer a variety of teaching, learning and research resources to students enrolled in courses at Florida State College at Jacksonville. LLC services include individual and small group tutoring; traditional and virtual library services and materials; subject-specific instruction including orientations; free workshops; study areas; and access to tutorials, computers, and multimedia technology. Click here to access the LLC website.

**Online Support Center/Technical Helpdesk**

If you have any problems with Blackboard, viewing online content, email or Connections, visit the Florida State College at Jacksonville Online Support Center. There you can browse helpful guides and material, search the knowledge base, and contact the technical support team directly via completion of an online form or live chat. The Support Center is also available via phone at 904.632.3151 or toll free at 866.886.4952.

Please remember that answers to questions about your course materials, tests, quizzes, or assignments can only be provided by your instructor.

Tutorials/Online Demonstrations

To view demonstrations of common Blackboard and computer activities, go to http://www.fscj.edu/tutorials/index.html.

Student Assistance Program

Any FSCJ student who is experiencing personal problems that might affect him/her in or out of school can now receive free counseling through Corporate Care Works, Inc. Issues may include stress, conflict, family worries, financial/legal issues, and balancing work and home. This Student Assistance Program (SAP) is delivered within the Federal Confidentiality Guidelines and helps students solve challenges in a confidential manner. Additional program details are as follows:

- 24 Hour Problem Resolution System
- Confidential counseling from licensed professionals
- On-Site crisis management

If you are interested in this service, please call (904) 384 -1800 or see your ASC advisor for more information.

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